



No. \*LB1561.M4A25

Copy 3



GIVEN BY

Massachusetts Department of Education







# A CURRICULUM GUIDE FOR INTERMEDIATE GRADE TEACHERS



# MASSACHUSETTS

## STATE DEPARTMENT OF EDUCATION



### **BOARD OF EDUCATION**

DR. ALEXANDER BRIN, Chairman

MISS GRACE A. BUXTON, Vice Chairman

DR. WILLIAM E. PARK, Secretary

DR. FRANK L. BOYDEN

MRS. JULIA M. FULLER

MR. G. JOHN GREGORY

DR. OWEN B. KIERNAN

DR. LEO C. DONAHUE

RT. REV. MSGR. CORNELIUS T. H. SHERLOCK



Digitized by the Internet Archive  
in 2016 with funding from  
Boston Public Library



# A CURRICULUM GUIDE FOR INTERMEDIATE GRADE TEACHERS



## MASSACHUSETTS STATE DEPARTMENT OF EDUCATION

**JOHN J. DESMOND, JR.**  
COMMISSIONER  
OF EDUCATION

**PATRICK J. SULLIVAN**  
DIRECTOR, DIVISION OF ELEMENTARY  
AND SECONDARY EDUCATION  
AND STATE TEACHERS COLLEGES

**ALICE B. BEAL**  
SUPERVISOR  
ELEMENTARY  
EDUCATION

~~\*LB 1523~~

\*LB 1561

~~M29~~

M4A25

~~1951~~

copy 3

~~Copy 4~~

LB 1523. M29

3 cop. - 1 T. Dept -  
2 B.S.S.

Mass. Dept of Education  
Mar. 9. 1954

11/17/62 Amw

## FOREWORD

Several years ago, the school superintendents of Massachusetts indicated, in answer to a questionnaire, a need for a course of study for the elementary schools.

Accordingly, the State Department of Education appointed committees composed of teachers, principals, supervisors, superintendents of schools, and state supervisors to study the situation and to recommend a course to meet this need. These committees have met at intervals during the past few years to plan and develop this GUIDE.

It was soon evident that a basic point of view had to be adopted and followed. The members of the committees discussed the present educational programs in Massachusetts, which are as varied as the schools themselves. They agreed that a course of study which would be most helpful in this state would have to follow a "middle-of-the-road" philosophy of education, rather than one planned for a very informal or a very conservative type of organization.

It was also agreed, as a guiding principle, that all education should be so planned that it would offer opportunities for all children to develop those fundamental understandings, skills, habits, attitudes, ideals, and appreciations necessary for living in a democratic society; and that it would lead children to become educated to live the richest possible lives and to contribute the utmost to their communities.

Many meetings were held by the various committees, by the chairmen, and by the chairmen with the Steering Committee. When the GUIDE had taken shape, a series of meetings was held which brought together the chairmen and all the faculty members of the State Teachers Colleges, for an understanding of the material contained in it.

All material contained in this GUIDE has been used by classroom teachers. It has been organized to serve as a help and a guide for elementary school teachers in any community in Massachusetts where the school officials and teachers may desire to make use of it either as a basic course or as a supplement to any material which they themselves may have developed. Hence it is presented under the name A CURRICULUM GUIDE FOR INTERMEDIATE GRADE TEACHERS.



## COMMITTEES

### GENERAL CHAIRMAN:

Alice B. Beal, State Supervisor of Elementary Education.

### GENERAL COMMITTEE

Rachel S. Bruce, State Teachers College, Fitchburg, Chairman, Science.

Ina M. Curley, Supervisor of Safety Education, State Department of Education.

Ruth E. Davis, State Teachers College, Bridgewater, Editorial Consultant.

Lois L. Decker, State Teachers College, Bridgewater, Chairman, Health Education.

Martina M. Driscoll, Supervisor, Field of Public School Music, State Department of Education.

Elizabeth V. Foster, State Teachers College, Worcester, Chairman, Social Studies.

Marie M. Gearan, State Teachers College, Lowell, Chairman, Language.

Mary J. Moriarty, State Teachers College, Bridgewater, Chairman, Physical Education.

Priscilla M. Nye, Massachusetts School of Art, Boston, Chairman, Art.

Mary A. O'Rourke, State Teachers College, Lowell, Chairman, Reading.

Mildred B. Stone, State Teachers College, Salem, Chairman, Arithmetic.

### MEMBERS OF COMMITTEES

Gertrude M. Abbihl, Co-chairman of Art Department, Wheelock College.

Florence M. Argy, Music Supervisor, Montague.

Madeline E. Bartell, Supervisor of Elementary Education, Needham.

Louise H. Borchers, Training School, State Teachers College, Bridgewater.

Helene D. Breivogel, Supervisor of Physical Education, Newton.

Elizabeth F. Crook, Music Supervisor, Plymouth.

Mary A. Doyle, Superintendent of Schools, Maynard.

Adele M. Driscoll, English, State Teachers College, Salem.

F. Eleanor Elliott, Director of Art, Newton.

Maryclare Hayes, Training School, State Teachers College, Lowell.

Ruth R. Herring, Art, State Teachers College, Framingham.

Harriet M. Higgins, Art Supervisor in Elementary Schools, Springfield.

Mary V. Hourihan, Training School, State Teachers College, Salem.

A. Kathleen Jacobs, Supervisor of Elementary Education, Amherst.

Janet Jansen, Teacher, Coddington School, Quincy.

Roberta M. Kellogg, Educational Consultant, Brockton.

Daniel J. Kelly, Supervisor of Physical Education, State Department of Education.

Theresa J. Lammers, Science, State Teachers College, Westfield.

Vera C. Lawson, Supervisor of Physical Education, Stoneham.  
 Evelyn R. Lindquist, Principal, Training School, State Teachers College, Bridgewater.  
 Mildred March, Principal, John Ward School, Newton.  
 C. Russell Mason, Executive Director, Massachusetts Audubon Society.  
 Katherine M. McCarty, State Teachers College, Fitchburg.  
 Mary J. McDermott, Principal, Bloomingdale School, Worcester.  
 Eleanor F. Moore, Music Supervisor, Gloucester.  
 Fredrika K. Moore, M.D., Former Consultant in School Hygiene, State Department of Public Health.  
 George H. Murphy, Music Director, Salem.  
 Dorothea E. Nicoll, Chief, Nutrition Bureau, State Department of Public Health.  
 Margaret O'Leary, Teacher, Junior High School, Needham.  
 Marion E. Remon, Supervisor of Elementary Education, Melrose.  
 Bernice McCann Ryan, Training School, State Teachers College, Lowell.  
 George Eleanor Shaw, Art, State Teachers College, Worcester.  
 Margaret A. Shea, Training School, State Teachers College, Fitchburg.  
 Frances Sherburne, Educational Staff, Massachusetts Audubon Society.  
 Katherine A. Sheridan, Principal, Calvin Coolidge School, Maynard.  
 Evelyn Silvester, Head Supervisor of Art, Weymouth.  
 Dorothy E. Snyder, Curator of Natural History, Peabody Museum, Salem.  
 Dorothy Stafford, Physical Education, State Teachers College, Worcester.  
 Eugene A. Sullivan, President, State Teachers College, Worcester.  
 Kelsey B. Sweatt, Director, Office of Radio-Audio-Visual Aids, State Department of Education.  
 Ellen C. Sweeney, Assistant Superintendent of Schools, New Bedford.  
 Martha M. Tobey, Mathematics, State Teachers College, Westfield.  
 Audrey L. Tripp, Supervisor of Elementary Education, Westport.  
 Sybil I. Tucker, Training School, State Teachers College, Salem.  
 Marion D. Twiss, Supervisor of Elementary Education, Worcester.  
 Inez K. Woodberry, Art Instructor, Brookline High School, Brookline.

#### STEERING COMMITTEE

Laurence G. Nourse, Superintendent of Schools, Norton and Plainville, Chairman.  
 William R. Barry, Superintendent of Schools, Northampton.  
 Teresa R. Flaherty, Director of Elementary Supervisors, Boston.  
 William C. Kvaraceus, Professor of Education, Boston University.  
 Thomas E. Rush, Superintendent of Schools, Weston.  
 Ellen C. Sweeney, Assistant Superintendent of Schools, New Bedford.

## ACKNOWLEDGMENTS

We wish to acknowledge, with thanks, the many types of assistance that have been rendered by individuals and groups. Their cooperation and contributions have helped in many ways. Some of our consultants have read and commented upon the course of study; others have made definite contributions to the content; teachers have experimented with units in their classrooms; several different organizations and interested friends of education have freely given time and effort to the production of the GUIDE.

Thanks are due to the following teachers and consultants in the field of education:

Margherita E. Auriemma, Teacher, Hunt School, Weymouth.  
 Mary L. Badger, Supervisor of Elementary Music Education, Needham.  
 Elizabeth R. Barlow, English, State Teachers College, Worcester.  
 Edna Banis, Teacher, Hyde School, Newton.  
 Charles Banuiekewicz, Student Teacher, State Teachers College, Worcester.  
 Mary E. Barraclough, Educational Staff, Massachusetts Audubon Society.  
 Mary S. Beitzel, Education Staff, Massachusetts Audubon Society.  
 Gladys J. Benton, Teacher, Stephen Palmer School, Needham.  
 James V. Bernardo, Educational Consultant, Civil Aeronautics Administration.  
 Louise Bignelli, Teacher, Robert C. Ingraham School, New Bedford.  
 Roberta S. Black, Teacher, John Hancock School, Lexington.  
 Ruth A. Blakeslee, Principal, Sumner Avenue School, Springfield.  
 Doris M. Blythe, Teacher, Charles A. Daniels School, Malden.  
 John T. Bone, Music Supervisor, Union No. 1.  
 Grace Bride, Teacher, School Street School, North Attleboro.  
 Helen E. Burke, Teacher, Prospect School, Beverly.  
 Albert W. Bussewitz, Superintendent, Moosehill Sanctuary, Sharon.  
 Doris A. Cambridge, Training School, State Teachers College, Salem.  
 Beatrice Campbell, Teacher, Lincoln School, Melrose.  
 Peter F. Carbone, Superintendent of Schools, Salem.  
 Pearl L. W. Care, Educational Staff, Massachusetts Audubon Society.  
 Lena Carter, Teacher, Weston.  
 Edythe T. Clark, Teacher, John Ward School, Newton.  
 Elizabeth C. Coffey, Training School, State Teachers College, Lowell.  
 Lois A. Cole, Teacher, Joseph G. Luther School, Swansea.  
 Ralph H. Colson, Assistant Supervisor of Physical Education, State Department of Education.  
 Florence E. Condrick, Teacher, Nevin School, Weymouth.  
 Grace M. Connell, Teacher, Kensington Avenue School, Springfield.  
 Martin E. Connors, Principal, Training School, Lowell.  
 Margaret E. Cotter, Teacher, Dwight School, Needham.  
 Anna M. Coughlin, Teacher, Bridge Street School, Northampton.  
 Carol Coulter, Teacher, Brookville.  
 Mary Rose Cox, Teacher, Ledge Street School, Worcester.

Mildred S. Crocker, Teacher, Carter School, Needham.  
Gladys R. Crosby, Teacher, Harwich Elementary School, Harwich.  
John V. Dennis, Educational Staff, Massachusetts Audubon Society.  
Ruth R. DeSouza, Teacher, Charles S. Ashley School, New Bedford.  
Elizabeth A. Devolder, Assistant, Office of Radio-Audio-Visual Aids, State Department of Education.  
Margaret Dingwall, Teacher, Nevin School, Weymouth.  
Mildred F. Donnelly, American Humane Educational Society.  
Vera M. Dowden, Teacher, Downing Street School, Worcester.  
Donald D. Dunn, Supervisor of Physical Education, Andover.  
Peter W. Dykema, Professor Emeritus, Teachers College, Columbia University.  
Josephine E. Enright, Music Supervisor, Elementary Grades, Pittsfield.  
Margaret K. Farrell, Teacher, Ledge Street School, Worcester.  
William R. Fisher, Music Supervisor, Needham.  
Adelaide M. Fitzgerald, Teacher, Emerson School, Malden.  
Vera B. Freeman, Art Supervisor, Weymouth.  
Warren S. Freeman, Dean, College of Music, Boston University.  
Dorothy E. Gallant, Remedial Reading, Weymouth.  
Ida E. Gerring, Teacher, Winthrop School, Melrose.  
Elizabeth Getchell, Teacher, Nevin School, Weymouth.  
Emily U. Goode, Educational Staff, Massachusetts Audubon Society.  
Marguerite L. Gourville, Social Studies, State Teachers College, Lowell.  
Emma Graham, Training School, State Teachers College, Lowell.  
Mildred E. Hacking, Teacher, Clarence A. Cook School, New Bedford.  
Henry M. Halvorsen, Music Editor, Boston.  
Ruth C. Harney, Teacher, Charles S. Ashley School, New Bedford.  
Richard Headstrom, Teacher, Dover.  
Margaret C. Heideman, Teacher, Stephen Palmer School, Needham.  
Mary V. Hourihan, Training School, State Teachers College, Salem.  
Shirley B. Howard, Lynnfield.  
Minerva Hudgins, Training School, State Teachers College, Salem.  
Helen L. Hulsman, Training School, State Teachers College, Bridgewater.  
William Hunt, Jr., M.D., Acting School Physician, Bridgewater.  
Bruce F. Jeffery, Director of Business Administration, State Teachers College, Salem.  
Eleanor V. Johnson, Teacher, Homer Street School, Springfield.  
Hazel M. Johnson, Music Supervisor, Adams.  
Marion E. Journeay, Teacher, Centre School, Merrimac.  
Helen J. Keating, Teacher, North Grafton School, Grafton.  
Mabel H. Keating, Teacher, Linden School, Malden.  
Grace Keenan, Supervisor of Health Education, Brockton.  
Helen J. Keily, Business Education, State Teachers College, Salem.  
Kenneth G. Kelley, Director, Graduate Division, College of Music, Boston University.  
Frederick S. Kempf, Music Supervisor, Walpole.  
Evelyn Keyes, Teacher, Kensington Avenue School, Springfield.



Francis Lambert, Student, State Teachers College, Lowell.  
Mary K. Lane, Teacher, Harris School, Needham.  
Jennie B. Lesniak, Training School, State Teachers College, Westfield.  
Mary P. Long, Teacher, Jonathan Maynard School, Framingham.  
Florence Lovejoy, Educational Staff, Massachusetts Audubon Society.  
Evelyn A. Lowell, Teacher, Harris School, Needham.  
Margaret G. Lynch, Elementary Supervisor, Fall River.  
Mary A. Maher, Training School, State Teachers College, Westfield.  
John J. Mahoney, Professor Emeritus, Boston University.  
Helene A. Malone, Teacher, Merrimac Street School, New Bedford.  
Gertrude F. Maroni, Teacher, Carter School, Needham.  
Mildred M. Martin, Music Supervisor, Revere.  
Mary J. Masselli, Teacher, Belmont School, Malden.  
Santi M. Mazza, Teacher, Sumner Avenue School, Springfield.  
Ruth P. McArdle, Teacher, Jerome Dwelly School, Fall River.  
Catherine A. MacDonald, Teacher, Springfield.  
Henry E. McGowan, Principal, Training School, State Teachers College, Lowell.  
Patricia M. McQuaid, Teacher, Maplewood School, Malden.  
Mildred L. McMullen, Teacher, Allen F. Wood School, New Bedford.  
Pauline Minde, Teacher, Ware.  
Edith Moser, Teacher, Phillips School, Salem.  
Mary B. Mullen, Teacher, George Street School, Leominster.  
Anna M. Murphy, Teacher, Mount Pleasant School, New Bedford.  
Louise Murphy, Principal, Jerome Dwelly School, Fall River.  
Theresa Nasella, Teacher, Paul Revere School, Revere.  
Derwood A. Newman, Superintendent of Schools, Needham  
Edith C. Nilson, Teacher, Beal School, Shrewsbury.  
Phyllis I. Nute, Educational Staff, Massachusetts Audubon Society.  
Catherine U. O'Connor, Training School, State Teachers College, Lowell.  
Priscilla Peabody, Teacher, Ryal Side School, Beverly.  
Olga M. Peet, Teacher, Carter School, Needham.  
Mary Perham, (formerly) Training School, Salem.  
Gladys Pitcher, Music Editor, Boston.  
Lilla Belle Pitts, Professor of Music Education, Teachers College, Columbia University.  
Gladys R. Potter, Teacher, Kensington Avenue School, Springfield.  
Eleanor M. Priestley, Teacher, Sagamore School, Sagamore.  
Elizabeth Quattlander, Training School, State Teachers College, Fitchburg.  
Marion E. Ray, Art Supervisor, Weymouth.  
Florence J. Raymond, Training School, State Teachers College, Bridgewater.  
Gordon L. Reynolds, Director of Art, State Department of Education, and President, Massachusetts School of Art.  
Harris A. Reynolds, Executive Secretary, Massachusetts Forest and Park Association.  
Mary Ribeiro, Teacher, John Hannegan School, New Bedford.

Bertha Richardson, Principal, Homer Street School, Springfield.  
Caroline F. Roche, Teacher, John Hannegan School, New Bedford.  
Dorothy B. Rogers, Teacher, J. C. Tripp School, Fairhaven.  
Mabel E. Roode, Principal, Pratt School, Weymouth.  
Grace V. Rowland, (formerly) English, State Teachers College, Framingham.  
Jane W. Russell, Harris School, New Bedford.  
Bernice McCann Ryan, Training School, State Teachers College, Lowell.  
Virginia Salaba, Student, State Teachers College, Westfield.  
Alvah W. Sanborn, Director, Pleasant Valley Sanctuary, Lenox.  
John Sawyer, Art Supervisor, Needham.  
Dorothy Shepard, Supervisor of Physical Education, Walpole.  
Mary E. Silva, Consultant, School Libraries, State Department of Education.  
Ruth K. Simons, Principal, Centerville School, Beverly.  
Helen E. Sleeper, Training School, State Teachers College, Bridgewater.  
Barbara Smith, Training School, State Teachers College, Fitchburg.  
Olive Smith, Teacher, Sumner Avenue School, Springfield.  
Wilma F. Smith, Teacher, Stephen Palmer School, Needham.  
Mary E. Spencer, Director, Health Education Department, Malden.  
Doris M. Sprague, Training School, State Teachers College, Bridgewater.  
Alice I. Story, Teacher, Adams School, Weymouth.  
Edward A. Sullivan, President, State Teachers College, Salem.  
Louise F. Thacher, Training School, Framingham.  
Cyrus D. Thompson, Music, State Teachers College, Lowell.  
Katherine Tousey, Educational Staff, Massachusetts Audubon Society.  
Catherine D. Towey, Training School, Bridgewater.  
Muriel C. Tully, Teacher, Leonard School, Malden.  
Mary L. Turner, Biology, Boston University.  
Robinette Ward, Training School, Framingham.  
Elsbeth M. Wayne, Music Supervisor, Union No. 44.  
Henry Witko, Student Teacher, State Teachers College, Worcester.  
Marie Zampeni, Educational Staff, Massachusetts Audubon Society.

## TABLE OF CONTENTS

### PART ONE: PROCEDURES IN THE ELEMENTARY SCHOOL

			Page
CHAPTER	I:	Basic Principles . . . . .	2
CHAPTER	II:	Questions Asked by Teachers . . . . .	5
		Goals . . . . .	5
		Classroom Organization . . . . .	5
		Subject Organization . . . . .	6
		Program and Time Allotment . . . . .	6
CHAPTER	III:	Goals and Evaluation . . . . .	8
		Teacher Self-Evaluation . . . . .	8
		Child Evaluation, Testing, Reports . . . . .	10
CHAPTER	IV:	School and Classroom Organization . . . . .	16
CHAPTER	V:	Subject Matter Organization . . . . .	21
		Explanation of What is Meant by "Units" . . . . .	21
		A Sample of Unit Procedure . . . . .	22
		Statement on Succession of Units . . . . .	24
CHAPTER	VI:	Program Arrangement and Time Allotments . . . . .	25
CHAPTER	VII:	Radio-Audio-Visual Aids . . . . .	26

### PART TWO: OVERVIEW OF MATERIAL FOR GRADES 4, 5, 6

CHAPTER	VIII:	Overview of Material . . . . .	30
---------	-------	--------------------------------	----

### PART THREE: CURRICULUM GUIDES IN SEPARATE SUBJECTS

CHAPTER	IX:	Arithmetic . . . . .	34
CHAPTER	X:	Art . . . . .	124
CHAPTER	XI:	Health . . . . .	142
CHAPTER	XII:		
	Section 1:	Language Arts . . . . .	202
	Section 2:	Reading . . . . .	223
CHAPTER	XIII:	Music . . . . .	246
CHAPTER	XIV:	Physical Education . . . . .	260
CHAPTER	XV:	Safety . . . . .	278
CHAPTER	XVI:	Science . . . . .	290
CHAPTER	XVII:	Social Studies . . . . .	427



**PART ONE**

**PROCEDURES IN THE ELEMENTARY SCHOOL**

**CHAPTER 1.****BASIC PRINCIPLES IN ELEMENTARY EDUCATION**

The major purpose of elementary education is to insure opportunities for all children to develop those fundamental understandings, skills, habits, attitudes, ideals, and appreciations necessary for living in democratic society.

The curriculum, which is the sum of all the school-directed experiences of children, must be so interpreted as to foster maximum child growth.

We believe that an educated person is quite different from a person who has nothing but narrow academic knowledge and training; that the school has an increasing responsibility for providing the broadest kind of experience; that a successful democracy depends upon the preservation of self-realization and civic responsibility; that every minute in the schoolroom, every lesson in arithmetic and science and language, properly conceived and properly taught, can help to shape ideas and ideals around and beyond the subject matter itself.

We believe that all subject matter, all theories of organization, and all methods and procedures, should alike pass the tests of usefulness in child development. Nothing should be retained merely because it is traditional. On the other hand, nothing should be adopted or discarded merely because the fashion of the hour favors such a course of action. The children in our care should be led to be and to become persons educated to live the richest possible lives and to contribute the utmost to their communities.

In accordance with this purpose, the elementary school must apply the following guiding principles in its curriculum and in its organization:

**1. It must provide conditions that will foster growth in democratic living.**

Life in an elementary school should be an experience in democratic living; that is, children should have an opportunity to practice desirable social relationships through group discussions and activities, each child being encouraged to work for the interest of the group. For training in independent thinking, children should decide those problems of daily living and working together for which they can be expected to find reasonably satisfactory solutions.

**2. It must realize that the child is a "total person," and must recognize the value and need of integrating experience in the school.**

In contrast to the older point of view, when the teacher often ignored the importance of the pupil's total environment, his physical make-up and his emotional life, the school of the present realizes that all these factors affect his living and learning. The teacher therefore attempts to develop all the factors of the pupil's personality; his health, attitudes, skills, and appreciations, as well as his knowledges.

The teacher also realizes that all these factors of growth and personality are required and acquired in purposeful situations. For this reason, many of the artificial subject matter divisions have given way to an integrated program reflecting life-like situations. Learnings and experiences thus acquired are real, purposeful, and lasting.

**3. It must recognize and provide for individual differences.**

Since children differ, the amount and rate of development will vary. Consequently, each child's present state of development must be recognized, regardless of the

grade in which he is placed. The standard set for the growth of each child should be the highest level that he individually is capable of reaching.

Activities and procedures must be selected and adapted on the basis of individual and group needs. The following provisions for continuous growth are recommended:

- a. Diagnosis of individual needs through standard and informal tests.
  - b. Establishment of flexible study groups within the class to meet the varying ability
  - c. Opportunities for the child to work with classes other than his own.
  - d. A program of enrichment and self-direction rather than one of undue acceleration for the gifted child.
  - e. Provision for increased time and guidance for the slow-learning child.
  - f. Preventive and remedial procedures applied at the point of individual or group need.
  - g. Advancement of the child to a higher group or grade when his achievement and also his physical, emotional, and social development warrant it.
4. **It must arouse and foster a desire for learning, by such procedures as the following:**
- a. Constant recognition of the fact that, unless the child desires to learn, teaching is largely in vain, and any knowledge thus gained will not be applied.
  - b. Provision for child activity so that the child may truly participate in the learning process.
  - c. Selection and guidance of experiences that are within the child's level of physical, mental, emotional, and social maturity, so that he can see real purpose in the learning activities.
  - d. Provision for child-participation in setting up goals and in planning ways of reaching them, so that the pupil may truly seek to solve the problems discovered.
5. **It must conserve, advance, and establish the physical and mental health of each child, by providing teaching, surroundings, and experiences such as the following:**
- a. Experiences leading the child to learn, accept, and practice simple, fundamental health principles relating to sleep, play, food, cleanliness, work, etc., because the child understands and desires their advantages.
  - b. Surroundings wholly in keeping with best health practices.
  - c. Co-operation with all health agencies; appreciation of their work.
  - d. A happy atmosphere where each child learns to work joyfully, to complete jobs within his capacity, to face reality, to develop the courage to face squarely the consequences of his own acts, to co-operate with and to understand and like the other members of his group, etc.; a place where each child can develop normal mental attitudes and emotional stability.

6. **It must provide for the acquisition of basic skills and knowledges.**

While the development of vigorous physical health, emotional poise and readiness to participate in democratic procedures are all important, the function of the elementary school is also to give children a command of the common integrating knowledges and skills. In the great majority of cases the interests of health and learning may

be served at the same time, and it seems doubtful that an entirely wholesome personality can be developed without growth in the mastery of common skills, tool subjects, and certain fundamentals of knowledge.

There is little serious dispute at the present time with the contention that the curriculum of the elementary school should lay the foundations (1) in the usual basic skills and knowledges, and also (2) in those studies which assist the child to growth in knowledge of the physical phenomena around him; understanding of society through its historical and geographical development; and ability to enjoy, and to some degree to create, significance and beauty. In every subject, learning should be so directed that it shall include not only the factual material, but also the opportunity for the enrichment and personal growth that is stressed throughout this description of the elementary school.

#### **7. It must emphasize desirable character growth.**

Wholesome development is influenced by such factors as the following:

- a. Inclusion of the child in a school life which is totally wholesome.
- b. Integration of the influence of teacher, parents, church, and community.
- c. Participation of the child in planning and experiencing learning situations organized to promote character growth.
- d. Child responsibility for intelligent self-direction in appropriate situations.



## CHAPTER II.

### QUESTIONS ASKED BY TEACHERS.

After reading the principles of elementary education as described in Chapter I, many teachers, especially young teachers and teachers who have held a somewhat different point of view, may be inclined to raise certain pertinent questions. Some of these questions will be answered in this chapter; others will be clarified in Part Three where the specific curricula of the various subject matter fields are presented.

**Question 1. If I am to focus my attention entirely upon a body of subject matter that is to be taught to all my children by the traditional procedures, what am I to keep in mind as my goal?**

**Answer:** The teacher is in the classroom to help each child grow desirably in all directions at the same time. While he is acquiring the tools of learning and important facts, he should also be growing in practical knowledge of his immediate surroundings, understanding of human relationship, ability to adjust himself to others, and personal efficiency. Such growth is partly a matter of what facts are selected for teaching, and partly a matter of how they are taught and how the general procedures of the classroom are handled. (See section on "Integrated Learnings" and later questions.) The teacher's goal will be desirable child progress in every phase of growth, **including** the necessary tools of learning.

**Question 2. How can I organize my school room so that such growth will take place?**

**Answer:** A schoolroom where emphasis is definitely upon child growth will have certain characteristics:

a. The room and the program will be arranged for healthful living, both mental and physical. This arrangement will include not only proper heating, lighting, ventilation, cleanliness, order, attractiveness, and appropriate furniture, but will also have space and time for varied activities with materials and tools, and as much freedom of movement and organization as the activities need, consistent with orderly procedures.

b. The room and program will be arranged for democratic living. Children may live in a room where they go through certain motions of democratic procedure without actual participation. In a room where each child's opinions are encouraged, freely expressed at proper times, and respectfully considered, democracy is in operation. Routine movements, certain rules for behavior, game periods, some class activities, committee activities, leadership opportunities, service opportunities, class planning, etc., may be considered by the children and teacher together, and decisions can be made which are understood by all. Children may often participate in directing activities with considerable responsibility, but this direction should not degenerate into "bossy" behavior, nor be confined only to the few most capable children.

c. The room and the program will be arranged for active and purposeful learning. Children do not become active, thinking, co-operative people through the process of sitting passively in a schoolroom chair and listening to the teacher. Most adults who are active, thinking, co-operative people became so without school help, either

because of fortunate conditions outside school, or because their unquenchable initiative survived school efforts to suppress it. The schoolroom should have movable furniture or plenty of extra work-space. There should be tables, shelves, books, pictures, and such tools as art-supplies, drill material, construction material, etc., to stimulate and record learning. There should be time, place, and opportunity for children to carry on individual and group activities in learning. There should be space for charts of progress and for display of results. Room order and decoration should be, as much as possible, the responsibility of children, i.e., a learning activity.

d. The "schoolroom" will often not be the schoolroom at all, but some other learning situation in the community,—the woods, the school-yard, the garden, a neighbor's meadow, etc. **Note:** Many teachers will say, "But I haven't all these things to work with." It is the duty of school authorities to make conditions as nearly ideal as possible, but does every teacher make the best use of the facilities she has? .. (See the section TEACHER SELF-EVALUATION.)

**Question 3. How shall I organize subject-matter so as to foster continuous child growth, not only in knowledge (which is important), but also at the same time in mental and social powers and skills?**

**Answer:** It is not safe to assume that facts learned without much connection with each other or with actual use will be properly applied when they are needed. Therefore, we need to associate facts with situations as much as possible.

The ways in which children learn facts, whether by the exertion of their own many and varied powers or by passive absorption, will vitally influence their use of these facts. Therefore, we need to set the stage for the children's active learning. Children can be led to set up goals for learning which they fully understand, and which they will seek to attain. They will accept standards for skills and will strive to meet them. Of course, teacher-stimulation and supervision are expected.

In the selection of subject-matter to be taught, the guiding principles should be the social usefulness of the material and the opportunity it gives children for growth in understanding—as well as tradition. Social studies and science, too often left out, should not be neglected. The subject-matter in these courses tries to carry out the principles here mentioned. See Part Three.

**Question 4. How can I arrange my program so as to allow time for activities and units of work?**

**Answer:** Roughly speaking, about one-half the time of the school week (or day, if it is thought desirable to work in terms of that unit) should probably be set aside for systematic attention to knowledges and skills in the tool subjects. (This statement is made for the guidance of teachers who would like to try the newer activity or unit procedures, but are not prepared to reorganize their total school room situation in terms of integrated procedures. Of course, teachers who wish to achieve more integration will follow other time-schedules.) The half thus set aside will be used for physical education, certain aspects of music, and the development and maintenance of the more mechanical skills involved in reading, penmanship, number, phonics, and spelling. Not all phases of these subjects will be confined to this period, because extensive reading, reading for information, practice in penmanship, development of number

relations, and motivation for spelling will be constantly recurring in the time allowed for unit teaching.

The remaining half of school time can be devoted to unit procedures, integrated procedures, activity program, or whatever name best fits the teacher's method. In this time, will be covered science, social studies, art, health, some music, most of the language, and the motivation and application of the tool subjects, as mentioned above. Unless it is necessary to work on a daily time schedule, work can be planned on a weekly basis, and the emphasis on science and social studies, which are closely correlated at the elementary level, can be alternated. (See section on TIME ALLOTMENTS, and also the introductions to the subject-matter sections.)

**CHAPTER III.****GOALS AND EVALUATION.**

It is possible to state the goals of education in many different ways. In this CURRICULUM GUIDE an attempt has been made to state these goals in terms of child growth. If this guiding principle in education is kept in mind, it follows that the teacher is successful just in so far as she succeeds in bringing about desirable child growth in all those areas over which she has any influence or control. The success of the total educational program will also be reckoned in the same terms. Consequently tests, progress charts, reports, and all phases of the evaluation program of the school will seek to discover and to record the total growth of the children, to the end that further procedures may be wisely planned.

**TEACHER SELF-EVALUATION.**

The check-list below is for the use of the teacher. Carefully answered, this check-list should help each teacher to locate the strong and weak points in her school room.

**SELF-EVALUATION. CHECK-LIST.****I. General Appearance of Room. (Functional Neatness).**

- A. Is the room well arranged for
  - Child learning? .....
  - Proper activity? .....
  - Health? .....
- B. Is it orderly and attractive? .....
  - Are pictures, bulletin boards, exhibits, library table, plants, etc., fresh and well arranged? .....
- C. Do the children share the responsibility for
  - Making the room attractive? .....
  - Keeping it orderly? .....
- D. Are there tangible evidences of good teaching procedures and child activity, such as
  - Bulletin boards? ....
  - Blackboard assignments? .....
  - Records? .....
  - Children's creative activities? .....
  - Illustrative collections? .....
  - Illustrative construction? .....

**II. General Atmosphere of Room.**

- A. Are children active, busy, self-reliant, alert? .....
- B. Do they appear friendly, social, responsive? .....
  - Are they actively courteous, and co-operative toward each other, the teacher, and visitors? .....
- C. Do many of them express their own ideas and suggestions? .....

- D. Are the teacher's manner, voice, general personality such as to lead and encourage children to develop the attitudes mentioned in A, B, and C? .....
- E. Is there mutual respect amongpupils? .....
- F. Is there mutual respect between teacher and pupils? .....
- G. Is the whole atmosphere one of purposeful, orderly, interested, co-operative learning and doing? .....
- H. Are the children learning to respect property? .....

### III. Program.

- A. During well-organized periods of simple recitation and drill
  - 1. Do children manifest active interest in their own achievement and improvement? .....
  - 2. Do they appear to connect information with practical needs, their own activities, etc? .....
  - 3. Are they taught practical and economical study habits? .....
  - 4. Do they recognize and seek to attain good standards? .....
- B. During periods in which children work independently or in groups
  - 1. Do they manifest true co-operation? .....
  - 2. Do they show self-control and self-direction? .....
  - 3. Do they achieve worthwhile results? .....
- C. Are there sufficient periods in which children are taught and encouraged to discuss, understand and evaluate
  - 1. The features of their own environment? .....
  - 2. Community and world facts and affairs? .....

(Do the children study such subjects as the social studies, science and health, through experiences, careful observation and wide reading, not through memorization of facts alone?)
- D. Are there sufficient periods in which children learn to appreciate and use art, and to express their ideas creatively through the arts? .....

  - Drawing and other manual arts? .....
  - Literature? .....
  - Music? .....

- E. Are there sufficient opportunities for children to share responsibility for their behavior through discussion of standards and suggestions for improvements?
- F. Are there periods in which children plan and evaluate their activities? .....

The chart reveals that the teacher measures herself in terms of pupil reaction and pupil relationship. A one hundred per cent affirmative answer may not be expected of every teacher when the chart questions are answered, but there is every reason to feel that an effort should be made by every teacher to approximate the very highest level of achievement in the program of self-evaluation. Reading and re-reading the items on the chart will help to focus the teacher's attention on the essentials of good pupil-teacher relationships and should bring about an improvement in the teacher's ability to obtain the best results for herself with equally good results on the part of her pupils.

## CHILD EVALUATION, TESTING, REPORTS

"A democratic education will seek to keep in mind as broad guiding principles for teaching, three general aims: first, the aim of building a proper respect for personality; second, the aim of building social-civic responsibility; and third, the aim of building social-intelligence."

The excerpt states briefly, but clearly, the aims necessary for a modern elementary school program. Objectives in terms of child growth enlarge upon the statement of aims and take into consideration all the areas of growth — mental, physical, moral, social, etc. — with which the modern elementary school must be concerned if it is to develop a citizenry capable of proper democratic living. Sharing the spotlight in the program of child development and growth is the problem of evaluation and measurement. Whether the program is one of self-evaluation, parental evaluation, or teacher evaluation, or a combination of all three, all areas of growth must be evaluated.

Before setting up a program, it is necessary to consider the items to be measured. Any learning situation involves the room, the teacher, the pupil, the home, the parents, and the community. A program must be continuously evaluated by the participants; especially must the teacher evaluate her own principles and practices as they affect the habits and attitudes of the individual and the group.

### HEALTH.

Another important item for consideration in the total growth of the pupil is that of health. Physical fitness programs are receiving universal attention and physical training now and in the future must become one of the school's major concerns. Teachers must be alert to the needs of the children who make poor personality adjustments, and they should study these needs in terms of physical as well as social deficiencies. Underlying many of the social and behavior weaknesses may be one of physical difficulty, which, when removed, may wholly or partially solve the behavior problem. (The term behavior problem is used to include work attitudes as well as conduct). It must be kept in mind that the only part the teacher may take in assisting the health officials in correcting health deficiencies is that of observation.

By using the chart prepared by the Massachusetts Department of Public Health the teacher may keep a simple yet effective record of her observation of the pupil. The chart record should be of inestimable help to the teacher in obtaining a satisfying "health picture" of the child, and, in addition, should aid the school physician in making his diagnosis. If there is difficulty in obtaining the services of a school physician, the teacher may use items on the chart in conference discussions with parents. The teacher, however, must have an understanding of some of the psychological as well as the physiological implications of the records she keeps. She must know the effects of poor vision, the results as well as the causes of listlessness, etc.

### TEACHER'S OBSERVATION OF HEALTH OF PUPIL

(Prepared by the Mass. Dept. of Public Health)

- |                                     |                              |
|-------------------------------------|------------------------------|
| 1. Eyes.                            | f. Protruding eyes.          |
| a. Sties or crusted lids.           | g. Watery eyes.              |
| b. Inflamed eyes.                   | h. Rubbing of eyes.          |
| c. Crossed eyes.                    | i. Excessive blinking.       |
| d. Repeated headaches.              | j. Twitching of the lids.    |
| e. Squinting, frowning or scowling. | k. Holding head to one side. |

2. Ears.
  - a. Discharge from ears.
  - b. Earache.
  - c. Failure to hear questions.
  - d. Picking at the ears.
  - e. Turning the head to hear.
  - f. Talking in a monotone.
  - g. Inattention.
  - h. Anxious expression.
  - i. Excessive noisiness of child.
  
3. Nose and Throat.
  - a. Persistent mouth breathing.
  - b. Frequent sore throat.
  - c. Recurrent colds.
  - d. Chronic nasal discharge.
  - e. Frequent nose bleeding.
  - f. Nasal speech.
  - g. Frequent tonsillitis.
  
4. Skin and Scalp.
  - a. Nits on the hair.
  - b. Unusual pallor of face.
  - c. Eruptions or rashes.
  - d. Habitual scratching of scalp or skin.
  - e. State of cleanliness.
  - f. Excessive redness of skin.
  
5. Teeth and Mouth.
  - a. State of cleanliness.
  - b. Gross visible caries.
  - c. Irregular teeth.
  - d. Stained teeth.
  - e. Offensive breath.
  - f. Mouth habits such as thumb sucking.
  
6. General Condition and Appearance.
  - a. Underweight—very thin.
  - b. Overweight—very obese.
  - c. Does not appear well.
  - d. Tires easily.
  - e. Chronic fatigue.
  - f. Nausea or vomiting.
  - g. Faintness or dizziness.
  
7. Growth.
  - a. Failure to gain regularly over 3 months period.
  - b. Unexplained loss in weight.
  - c. Unexplained rapid gain in weight.
  
8. Glands.
  - a. Enlarged glands at side of neck.
  - b. Enlarged thyroid.
  
9. Heart.
  - a. Excessive breathlessness.
  - b. Tires readily.
  - c. Any history of "growing pains".
  - d. Bluish lips.
  - e. Excessive pallor.
  
10. Posture and Musculature.
  - a. Asymmetry of shoulders and hips.
  - b. Peculiarity of gait.
  - c. Obvious deformities of any type.
  - d. Anomalies of muscular development.
  
11. Behavior.
  - a. Overstudious, docile and withdrawing.
  - b. Bullying, over-aggressive and domineering.
  - c. Unhappy and depressed.
  - d. Overexcitable, uncontrollable emotions.
  - e. Stuttering or other forms of speech difficulty.
  - f. Lack of confidence, self-denial and self-censure.
  - g. Poor accomplishment in comparison with ability.
  - h. Lying (imaginative or defensive).
  - i. Lack of appreciation of property rights (stealing).
  - j. Abnormal sex behavior.
  - k. Antagonistic, negativistic, continually quarreling.

## ANECDOTAL RECORD.

In all schools there are pupils who find it hard to adjust themselves to school conditions. Such cases need careful and objective individual study. An aid to the teacher in keeping an objective account of the pupil's behavior, traits, habits and attitudes, is the anecdotal record.

The anecdotal record is an objective account of pupil behavior made by the teacher or some other person observing a significant event in the life of the pupil. Such records may be of three kinds:

1. A simple narrative of the child's actual behavior responses or of events in which he takes a significant part.

Ex. Charles took care of library books with considerable efficiency.

2. A record of observation with an interpretation.

Ex. Charles cut paper for a box without waiting for direction or instruction. He spoiled the paper. He has a habit of going ahead without waiting for instruction.

3. A record accompanied by recommendations either to the student or some supervising officer.

Ex. Charles does not volunteer in class. He acquits himself well, however, when approached. He has ability. I do not understand why he does not do more and better work. An interview is recommended.

An anecdotal record should supply data for increased faculty understanding of the behavior, abilities, and reactions of an individual. The data may be used for guidance by the teacher or for self-evaluation by the pupil. It may be of greater help in a remedial program than the use of diagnostic tests. It should be of inestimable value in interpreting the student's needs to the parents and to the community. It should serve as qualitative material to supplement and assist in the interpretation of quantitative records.

Some of the methods of obtaining anecdotal records are interviews with parents, teachers, or the child himself, from school records including examinations, school behavior, social behavior, playground participation, extra-curricular activity participation, use and care of materials, etc. It must be kept in mind that the teacher should keep account of good as well as unsatisfactory traits; that facts not opinions should be listed; and that the study should be considered in the light of good psychological and sociological standards and not in terms of the teacher's own feelings.

A simple form of anecdotal record, one that will not require too much time in keeping is essential. A simple, yet effective form is shown in brief:

From: Jan. 3 to Jan. 10		Name J. E.			
Date	Teacher	Health	Attitude	Appearance	Anecdote
1- 3-'50	E. A.	Ex.	Fair	Good	Leadership on play ground. Finished work in arithmetic.
1-10-'50	E. A.	Ex.	Fair	Good	

Teacher's Recommendation \_\_\_\_\_



Such a record need not be kept for every pupil. It takes time and it is not needed for all pupils.

The teacher's evaluation of pupil growth should be supplemented by definite measures of the type found in standard psychological, readiness, and achievement tests. Objective tests are precise and exact. They have a tendency to measure more accurately than the ordinary teacher's examination, and they provide answers to such questions as, "What can I expect of this child?" or "How much progress has the child made in a given time?"

The teacher in the elementary grades should make extensive use of readiness tests. By readiness tests we mean instruments which help us to know something of the child's previous experiences, his interests, hobbies, aptitudes, health, etc.

The intelligence test is of use to the teacher if she considers the results as a means of understanding the child's possible ability to learn or to adapt himself to new situations.

There are many approved psychological, readiness, and educational tests on the market. The teacher needs to know what she wishes to measure and then decide upon the test which will best meet her needs.

The teacher who needs further enlightenment about the testing program in the elementary field may get profitable assistance from many recent publications.

#### SELF-EVALUATION.

The most important figure in the program of evaluation is the child. Only as the child knows what he is striving for will he be able to reach the levels toward which he is being guided. A program of self-evaluation to be carried out by the child will give him a picture of how well he works, studies, and conducts himself. It should be borne in mind that the elementary child may become easily confused, tired and overwhelmed, if the task of evaluation is not simple and direct.

The best form of pupil self-evaluation chart is one in which the pupils have participated in the making. In the planning that takes place at the beginning of a unit of work, pupils should state the goals toward which they are working. They must know **what** they are going to do, why they are going to do it, and how they are going to do it. Then they are ready to determine the points that must be kept in mind if the work is to be well done, and if each one is to work well with other members of the group.

"How are we going to do it?" involves the methods to be used in solving the problem. In addition, it requires that the children have certain patterns of behavior while they work. When children themselves help to set up the patterns of behavior or rules of conduct, they understand the purposes underlying them and they are then more willing to co-operate. Children learn good habits from practicing them. A chart may serve as a guide but the mere existence of such an instrument does not guarantee good results. The stimulation of practice and living in situations, in the classroom and out of it, wherein pupils have a chance to check themselves on the basis of real performance, should be the reason for the existence of a self-evaluation child chart. For example, the statement, "I work well with others", loses its significance unless the child has actively participated in group work. "Working well together", means sharing together, experiencing together, making together, talking together, etc. The chart to be significant, then, must be based upon the type of classroom activity and participation that allows children really to evaluate themselves and their actions. Again there is no standard chart for pupil-evaluation. The best measurement programs are those that fit the individual school or the individual child. The child should be evaluated in terms

of what he can do, and the class chart for self-evaluation of the pupils in the class should be built in terms of what the present class can do.

In planning a unit of work, the teacher should reserve one section for evaluations. The child self-evaluation chart should be built at the beginning of the unit, and as new situations arise new items of evaluation should be added. In other words, the best chart is the growing chart that pupils build as they meet the need or come upon a situation calling for action. Under the heading "Courtesy" the children may raise questions such as:

Do I await my turn?

Do I say "thank you"?

Do I work quietly?

From questions of this type the chart in statement form should be planned. Each pupil should have his own chart in his folder. A simple form should be used.

---

#### CHILD SELF-EVALUATION CHART

---

Section I. Courtesy and Co-operation.	Yes	No
1. I work well with my group.	X	
2. I play without quarreling.	X	
3. I am considerate of others. (Teacher and pupils add other items.)		
Section II. Work Habits.		
1. I listen well.		
2. I am responsible for keeping my materials in order.		
3. I follow directions promptly. (Teacher and pupils add other items.)		
Section III. Health Habits.		

---

The teacher should list main headings such as courtesy and co-operation, work habits, and any other headings which apply in her classroom. The children should suggest questions relative to these headings. This requires careful preparation and much guidance, and should result in the organization of a chart which will enable children to make self-evaluations and self-improvements.

#### PARENT-TEACHER RELATIONSHIPS.

The final phase in the program of evaluation centers around parent-teacher relationships. Parents rate schools in terms of what the school does to the child, and they still rely on records and reports as the main basis of judgment. Very little thought is given to improvement in behavior and attitude, but much elation results when Johnnie goes from "C" to "A" in arithmetic. The growth in arithmetic is one small fragment

in Johnnie's total growth, and the improvement in behavior and attitudes is completely overlooked. This brings us to the need for the evaluation of teacher-home relationships in terms of parents' understandings of the objectives of our schools.

The trend in marking seems to be toward a system which allows for a greater amount of description of the pupil's total growth. Evaluating a pupil in terms of his own ability and growth is a difficult task. While it is desirable to give a child a mark which shows his growth in terms of his capacity, nevertheless it is imperative that he be evaluated as a member of the group.

Modern report cards provide for this trend by specific statements to the pupils and parents regarding phases of the pupil's growth which need special attention. Such statements are based upon the development and ability of the individual. Growth in relation to ability is the major concern of the school.

Parent co-operation should be enlisted in rating and guiding the child. A report card should give parents a valuable report, enlist the parent's interest and co-operation in his own child's progress as against interest in "marks" only, and enlist the parent's interest in the entire school program.

A report may also include an evaluation by the parent of certain traits seen at home such as behavior, work habits, reliability, etc. If the parent's report is too far out of harmony with the child's school behavior and progress, a conference between the teacher and parent is not only helpful but necessary.

A place should be reserved on the card to care for the needs of those of low ability in order that they may be marked so that parents and the child will understand that the mark is according to the individual's own ability and not according to group ratings. **His card is good if he has done his best.** He knows that he has not done the content subjects well, but that he is an appreciative as well as an appreciated member of his class by the written evidence. No one is deceived, and the report may be presented with the transfer anywhere and the receiving school has the necessary information to proceed with his placement without humiliation or embarrassment. Again the parent has been well informed and can supplement the card in giving assistance in the new situation.

Burton says, "The logical outcome of increasing accurate descriptions in terms of learning is the abandonment of marks in favor of the descriptions themselves." The report card must serve for guiding as well as rating.

For satisfactory evaluation, the teacher needs to know the child's activities both inside school and out. She must know and make use of the resources of the home. The parent, too, must be interested in the child's total development, should understand what the school is trying to do, and know ways and means of helping the teacher. **Each needs the other's point of view.**

**CHAPTER IV.****SCHOOL AND CLASSROOM ORGANIZATION.****SPECIFIC SUGGESTIONS FOR A CLASSROOM IN WHICH CHILDREN LIVE TOGETHER.**

1. Organize the room into convenient centers of interest. Keep together things which will be used together; brushes, paints, paper on adjacent shelves; reading table and chairs near the bookcases, etc.
2. Have certain necessities, such as paper, crayons, clay, library books, always available to children.
3. Keep up supplies. Keep them in good condition. Keep them in order.
4. Classify all pictures. Keep them in labeled folders. Mount for attractiveness and durability. Teach children to use and display them.
5. Provide each child with a place for his work and materials.
6. Space and materials for work are a requisite. Some teachers prefer the workshop or laboratory type of schoolroom. For this, movable furniture is desirable though not absolutely necessary. An ideal arrangement is a large workroom with a smaller quiet room opening into it. A folding screen is sometimes a substitute for this arrangement.

Quite as important is the need for proper materials. Many a valuable activity has died because the tools were dull or the paint too thick, or because the child's request for a "piece of paper for the airplane wing" was neglected or refused.

7. Quite as essential is a teacher with a movable point of view. It has been said that, "A teacher is leader, chairman, interlocutor, coach, umpire, taskmaster, guide or friend, as occasion may require."

**SPECIFIC SUGGESTIONS FOR CO-OPERATIVE ACTIVITIES.**

1. Good housekeeping is a co-operative undertaking. Children and teacher together can plan how to make the best of conditions as they are and decide what desirable changes should be made.
2. Such activities as exhibits, programs, public performances, parties and sales may be nuisances or positive dangers, or they may be valuable contributions to child growth and community understanding. The teacher should avoid complicated, artificial situations and opportunities for a few children to "show off". All children should participate; all exhibited offerings should be the product of children's creative work, not of teacher re-touching; all food served should be simple and wholesome. Neither the school nor any "cause" has a right to profit financially at the expense of children's health or by practices in opposition to the health teaching of the school. Only nutritious food should be sold at the school.

Social development should be the keynote of all school activities. They should be simple, well-planned, and not overtaxing for teachers or children.

3. Lunchrooms, playground, and school safety measures furnish many opportunities for co-operative planning. School councils and other less formal procedures help to stimulate children to take responsibility for their own and group action.

4. A school library for children and teachers furnishes not only a valuable stimulation to reading, but also an opportunity for extension of experience. The same can be said of such enlargements of the library as a "science room" or a "museum," whose uses are manifold. An "art room" or "studio" is another excellent stimulus. The only bar to these activities is the lack of time needed to set up and supervise them. In some schools, however, these ideas can be put into practice.

5. A playroom, well-lighted, ventilated and clean, with painted lines for activities, will supplement the playground. Simple apparatus is helpful. Mats are very useful.

#### SPECIFIC SUGGESTIONS FOR USING THE COMMUNITY AS A LABORATORY.

1. Most science learning should consist of experience with things rather than the reading of words. If a child is to become acquainted with his environment he must see, hear, handle, smell, or even sometimes taste the things themselves. Sometimes this cannot be done in the schoolroom as well as it can be done in the field, wood, store, or at the fire station. The same principle applies to parts of the social studies.

2. There are people in every community who are not only able but quite willing to help children learn. Sometimes they can introduce the children to new experiences; sometimes they can answer questions after the children have made preliminary studies. The experience is often excellent for all the participants, including the regular teacher and the guest instructor.

3. Excursions need co-operative organization. Often parents can help.

#### EXCURSIONS.

Trips offer an exceedingly vital way for children to gather data. To get real value from the trip there ought to be some purpose or an expressed interest in the subject that is clear both to the teacher and children. No excursion should be taken merely because "it would be so interesting to the children." The purpose of a trip should be to further some activity or answer some need. Children should go on a trip as they would go to a library, to gather information, i.e., to find out and see for themselves.

Each trip must justify itself from many angles before it can be considered worth the time and effort which it requires.

1. Will the children gain new ideas which will help clarify or extend their thinking at the present stage of study?
2. Will the children be able to answer some questions which have been under discussion?
3. Will the children develop new interests?
4. Will the children form ideas or attitudes which will be constructive and of value?
5. Is the trip the best way to get the desired information?

Both the preparation for the trip and the follow-up work afterward are very important and deserve thoughtful planning. A valuable trip does not begin and end merely with observation of the environment. Sometimes the trip is a good starting point, and sometimes it should come at the conclusion of a unit study. Trip observation should lead out into related subject matter. What goes on at school in thinking, experimenting,

and learning, of which the trip is only a part, is the real justification for the excursion. The trip, excursion, or school journey helps to integrate the whole experience of the child—his life within the school and without.

#### THE PRACTICAL MANAGEMENT OF TRIPS.

1. How often? Each particular situation must govern the decision, but trips should be taken only when there is vital interest in and value to be gained from such an activity.
2. How far? Again the local situation and common sense should govern the decision. As a general rule, trips should be only as far as the safety and comfort of children will permit.
3. How travel? Trips often prove a wonderful connecting link between school and home when some mothers are invited to provide cars for transportation and to accompany the children. Consider also the street car or bus; but here is involved a question of expense for carfare. Perhaps a school bus could be provided for use during school hours. Walking is probably the most satisfactory mode of travel. It affords an opportunity for leisurely observation that is impossible from a rapidly moving car. Then again, it permits conversation. But distance must determine the mode of transportation.
4. Expense? Seldom is any expense necessary. However, should there be an expense, it might be financed in one of several ways. Each parent might pay the expenses of his own child; the school (or P.T.A.) might set aside a small sum for this purpose; or the children may earn the necessary amount. Think of the problems in purposeful arithmetic arising from the administration of such a fund!
5. Safety? Certain safeguards are sometimes necessary. Children may get consent of parents by taking home notices of the proposed trip and returning them signed. If they are to go by automobile, list cars and children for each. Decide also the route, place of leaving, unloading, meeting, etc., and have it understood by all. This may be a very opportune time for a lesson or series of lessons on safety.
6. Preparation? Certainly. It does not detract from a visit to discuss it beforehand; rather it adds to its charm. Children love to see things they know about. Preparation should stimulate the children's curiosity and motivate the observation. Special assignments are splendid. Let individuals have some particular responsibility, something to look for, something upon which to report.

Arrangements for visits should be made well in advance with the business concern, owner, or person in charge. Many times special guides will be furnished. It is surprising how heartily interested grown-ups are in the children and how kind they are once they understand the children's problems and needs. Often the teacher should make an advance visit and become familiar with the situation, thus being able to give the class a better preparation. Often everything cannot be seen in one trip. Have a definite goal in mind and stick to it, allowing for incidental attention to unexpected things.

A trip furnishes a splendid opportunity to teach courtesy. The children should be taught first of all, to be polite and considerate of each other; not to want the best place always or to be first to stand by the guide. They should assume the responsibility of thanking those who have assisted with the excursion. Here is a wonderful opportunity for writing notes of thanks. Children should be taught the simple rules of good manners that govern one's behavior in public.

Field trips should satisfy one or more of these specific purposes:

1. They should help pupils to come into real contact with the immediate environment and so to gain a better understanding of it.
2. They should provide first hand information and supplement the textbook.
3. They should suggest activities that lead into other valuable experiences.
4. They should supply the basis for content material that develops in the classroom.
5. They should settle debated points or verify conclusions.

## **BIBLIOGRAPHY.**

### **Methods of Teaching.**

- Baker, Harry J. INTRODUCTION TO EXCEPTIONAL CHILDREN. New York: The Macmillan Co., 1944.
- Baxter, Bernice, and Bradley, Anne M. AN OVERVIEW OF ELEMENTARY EDUCATION. New York: D. C. Heath & Co., 1945.
- Bobbitt, John F. THE CURRICULUM OF MODERN EDUCATION. New York: McGraw-Hill Book Co., Inc., 1941.
- Burton, William H. THE GUIDANCE OF LEARNING ACTIVITIES: A SUMMARY OF THE PRINCIPLES OF TEACHING AS BASED UPON THE PRINCIPLES OF LEARNING. New York: D. Appleton-Century Co., Inc., 1944.
- Driscoll, Gertrude. HOW TO STUDY THE BEHAVIOR OF CHILDREN: PRACTICAL SUGGESTIONS FOR TEACHING, No. 2. New York: Teachers College, Columbia University, 1941.
- EDUCATION FOR ALL AMERICAN CHILDREN. Washington: Educational Policies Commission. National Education Association of the United States and the American Association of School Administrators, 1948.
- ELEMENTARY SCHOOLS—THE FRONTLINE OF DEMOCRACY. Twenty-Second Yearbook of the Department of Elementary School Principals. Washington: National Education Association, 1943.
- Greene, Harry A.; Jorgensen, A. N.; and Gerberich, J. R. MEASUREMENT AND EVALUATION IN THE ELEMENTARY SCHOOL. New York: Longmans Green & Co., 1947.
- GROUP PLANNING IN EDUCATION. 1945 Yearbook of the Department of Supervision and Curriculum Development. Washington: Department of Supervision and Curriculum Development, National Education Association, 1945.
- HELPING TEACHERS UNDERSTAND CHILDREN. Washington, D. C.: American Council on Education, 1945.
- Hildreth, Gertrude H. CHILD GROWTH THROUGH EDUCATION; EFFECTIVE TEACHING IN THE MODEL SCHOOL. New York: The Ronald Press Co., 1948.
- Hockett, John, and Jacobsen, E. W. MODERN PRACTICES IN THE ELEMENTARY SCHOOL. Boston: Cinn & Co., 1944 (revised).

- HOW CHILDREN DEVELOP. Adventures in Education, University School Series, No. 3. Columbus, Ohio: Ohio State University, 1946.
- Jenkins, Gladys Gardner, and Others. THESE ARE YOUR CHILDREN. Chicago: Scott, Foresman & Co., 1948.
- Jersild, Arthur T., and Others. CHILD DEVELOPMENT AND THE CURRICULUM. New York: Bureau of Publications, Teachers College, Columbia University, 1946.
- Lane, Robert H. THE TEACHER IN THE MODERN ELEMENTARY SCHOOL. Boston: Houghton Mifflin Co., 1941.
- Lee, J. Murray, and Lee, Dorris M. P. THE CHILD AND HIS CURRICULUM. New York: D. Appleton-Century Co., Inc., 1940.
- Leonard, J. Paul; Eurich, A. C.; and Others. AN EVALUATION OF MODERN EDUCATION. A report sponsored by the Society for Curriculum Study. New York: D. Appleton-Century Co., Inc., 1942.
- Macomber, Freeman G. GUIDING CHILD DEVELOPMENT IN THE ELEMENTARY SCHOOL. New York: American Book Co., 1941.
- Miel, Alice. CHANGING THE CURRICULUM: A SOCIAL PROCESS. New York: D. Appleton-Century Co., Inc., 1946.
- Mossman, Lois C. THE ACTIVITY CONCEPT. New York: The Macmillan Co., 1938.
- Olsen, Edward G. SCHOOL AND COMMUNITY. New York: Prentice-Hall, Inc., 1945.
- Olson, Willard. CHILD DEVELOPMENT. ..Boston: D. C. Heath & Co., 1949.
- Ross, Clay C. MEASUREMENTS IN TODAY'S SCHOOLS. ..New York: Prentice-Hall, Inc., 1947 (second edition).
- Saucier, Weems A. THEORY AND PRACTICE IN THE ELEMENTARY SCHOOL. New York: The Macmillan Co., 1941.
- Schneideman, Rose. DEMOCRATIC EDUCATION IN PRACTICE. New York: Harper & Bros., 1945.
- Stratemeyer, Florence; Forkner, H. L., and McKim, M. G. DEVELOPING A CURRICULUM FOR MODERN LIVING. New York: Bureau of Publications, Teachers College, Columbia University, 1947.
- THE MEASUREMENT OF UNDERSTANDING. Forty-Fifth Yearbook of the National Society for the Study of Education, Part I. Chicago: University of Chicago Press, 1946.
- TOWARD BETTER TEACHING. 1949 Yearbook of the Association for Supervision and Curriculum Development. Washington: Association for Supervision and Curriculum Development, National Education Association, 1949.
- Wofford, Kate V. TEACHING IN SMALL SCHOOLS. New York: The Macmillan Co., 1946.
- Wrightstone, J. Wayne. APPRAISAL OF NEWER ELEMENTARY SCHOOL PRACTICES. New York: Teachers College, Columbia University, 1938.
- Yoakam, Gerald A., and Simpson, Robert G. MODERN METHODS AND TECHNIQUES OF TEACHING. New York: The Macmillan Co., 1948.



## CHAPTER V.

### ORGANIZATION.

It will be seen that much of the material in Part Three is organized in the form of unit studies. This form of organization is adopted, because it lends itself to good planning and good teaching procedures whether or not the teacher wishes to integrate her work. Neither the committee nor most Massachusetts teachers are ready to accept and put into practice an extreme form of integrated program. The committee feels, however, that many teachers would like to take a forward step in the direction of more unified planning which will do away with the disjointed program of learnings all too frequent in the primary schools, and will allow teacher and children to think in terms of broader relationships. Consequently, the units are stressed in order that teachers may see the subject matter from the point of view of long-range planning and may see learning in terms of child activities.

#### Explanation of term "unit."

A unit of work includes the various experiences and activities of a grade of which some one interest is the center. The use of units of study grows out of the concept that the chief function of the school is to guide children into those experiences that will result in desired modifications of pupil conduct and ways of thinking. An important value of the unit is that it furnishes opportunity for more than the intellectual development of the child. It provides also for social and emotional development as children work and plan together.

Some plan or sequence of units is desirable in order to insure progress and avoid much repetition. A variety of types should also be presented in order to provide for breadth of experience.

Experiences of interest to the class often develop spontaneously into units of study. At other times, the teacher must lead the children's interest toward some sequence of experiences that she feels desirable or necessary for them. As a result of much study of children by psychologists and others and of classroom experimentation, the general interests of children are fairly well known. A recommended selection of units of study is based on these general interests. Of course, the background and interests of the class will influence the teacher's selection from the general list.

Many teachers will ask, "How do I go about planning and starting a unit?"

The first step is commonly known as orientation or approach. The main purpose is to arouse or co-ordinate interest and develop some background. This may be done by looking at and discussing pictures, by seeing lantern slides, by reporting an interesting experience, by taking a class trip or by reading stories. If the unit deals with materials already familiar, the problem is to get an approach that will challenge the pupils.

After the children have raised several intelligent questions, some discussion should follow. Out of the discussion should grow the plan of the work. Some teachers like to list the questions on the blackboard. These can be organized into larger topics. Often it is a good procedure to divide the class into committees, each committee working on one or more problems. The teacher must, of course, help the children to find information and must guide them in working out solutions.

The study part of the unit consists in bringing together and organizing all possible information from such sources as trips, pictures, people, visual materials, books, inter-

views, letters, etc. Writing, reading, oral reports, construction, drawing, dramatization, collections, are means of presenting the reports of committees to the class. The various committee reports, together with the activities carried on by the class as a whole, will serve as a basis for the final organization and evaluation of the unit study as a whole. Sometimes a large activity will be developed to record or present the results of the study. This activity is commonly called a culmination. Suggestions for possible culminating activities will be found in some of the units in Part Three.

Skills are most effectively taught when children have a need for them. When such needs arise during a unit, the skills should be taught at once. Teachers often overlook such valuable opportunities. Other teachers feel that while the unit is being studied no unrelated subject matter should be taught. But skills must be maintained even when they are not related to the unit. Under these circumstances, most teachers find it desirable to provide periods in the program for this purpose.

## **A SAMPLE OF UNIT PROCEDURE AS APPLIED TO THE STUDY OF SOUTH AMERICA.**

### INTRODUCTION

A study of South America proves to be fascinating and interesting for elementary school children. There are so many new and different things to discuss, discover and learn about as we travel through this neighbor continent. The people, their languages and customs, and their different lands open a new wealth of interest for sixth grade children.

Through map and globe study children discover their neighbors to the South and to the North and decide that they would like to find out about their Southern neighbor, South America. They might see the film entitled, AMERICANS ALL. This film gives a general overview of all the continent and its people. Discussion following the showing of the film will bring out several important points and questions. Children could formulate a list of questions on WHAT WE WANT TO KNOW ABOUT SOUTH AMERICA. This question period will arouse the interest of each child for during the discussion time every child will contribute a comment or question. The questions can be printed on large sheets of paper and posted in the room for everyone to see. The questions can then be duplicated so that each child will have a copy as his own individual study guide.

The children decide then that they would prefer to answer all questions on the sheet rather than divide into groups each taking several questions to find information about.

Through individual reading in many different reference books in social studies, encyclopedias, and geography texts each child works along at his own rate and answers his own question sheet. It might take a week to complete this reading. The children write their answers and then have oral discussion and an answer period. At this time would be shared a wealth of knowledge and information about South America. Information not included in original questions would be presented.

In their reading children discover the point that South America is divided into different countries. These could be listed and for the first part of the group work on research they might choose one or two countries. The children would be grouped and then would vote for their own chairmen and secretary. The groups would meet together and the chairman would assign a topic for study to each person in the group. For example, one member might be delegated to find out about the history and geography of the country; another might be delegated to read and report on Cities and Places of Interest;

another might be delegated to find out about Famous People and their Contributions, etc.

Here again the opportunity for individual reading research would be supplemented by teacher and class discussion periods.

The chairman of each group takes the responsibility of helping children locate and then organize material into report form. The chairman and secretary read and check reports for the group. When the group is ready to share their information with the class, they report to the rest of the class orally under the direction of their group leader. Often the reporting group has formulated a quiz, sometimes oral, other times written to be given to entire class following their report. It is well for the teacher to test after each group report. She must also be careful to check on the material reported for its authenticity and meaningfulness to the children.

In the meantime, though, each child is doing intensive and thoughtful research reading to find out all he can about his topic. He also has an opportunity for general reading on topics of other groups. This type of reading we refer to as Background Reading. Having some familiarity with topics on which others are reporting helps the listeners to listen intelligently to reports and to ask good questions and make worthwhile comments.

#### ACTIVITIES. (Things to Do).

The varied activities that should accompany a valuable unit program will lend enrichment, meaning, and interest to the study.

A suggested list of activities that have been carried on successfully by children in the upper elementary grades follows:

1. Oral and written reports on individual topics.
2. Organize individual notebooks on the country being studied.
3. Write to Pan American Organization for pamphlets, pictures, etc.
4. Collect travel folders picturing and telling about S.A.
5. Exchange letters with children in a S.A. school.
6. Plan a play on life in S.A.
7. Make dioramas showing scenes in S.A.
8. Make relief map of S.A., showing exports, imports, etc.
9. Do clay modeling.
10. Weave.
11. Make dolls and dress them in costumes of various parts of S.A.
12. Make leather bookmarks with stencil design.
13. List all things we use in daily life that come from S.A.
14. Plan an assembly program on a Fiesta in S.A.
15. Learn songs and dances of S.A.
16. See as many good movies as are available.

17. Exhibit materials that children bring in: dolls, pictures, post cards, magazine articles, etc.
18. Exhibit Children's Museum and Pan American Society exhibits.
19. Play records of typical S.A. music.

#### **STATEMENT CONCERNING A YEAR'S SUCCESSION OF UNITS.**

It is, of course, understood that the tool-subjects are carried on continuously throughout the year. The other phases of the work, however, may be combined or alternated, as has already been suggested. Many teachers or school systems prefer to make out, tentatively, in the fall, a list of subject-matter units to be developed during the year. If special circumstances arise, however, this list may be revised. For instance, in the fall a science unit may be selected as the major activity for two or three weeks or more. Certain aspects of health and social studies may enter into it. It will involve much art, language, and reading. The next unit may be selected from the field of social studies, and no time will be given to science while this unit is in progress, except as related science comes into the unit. This unit may take several weeks, if it has many phases. The next may be a brief unit in health, and so on. All subjects will have their proper apportionment of time during the year.

**CHAPTER VI.**

**PROGRAMS AND TIME ALLOTMENTS. (Suggestions only).**

This time allotment was made by the chairmen of the general committee as a guide to teachers who wish to check the time given to different phases of learning, whether the program is formal or informal. The percentages, as given, are intended to be minimums. The surplus of time in each grade will be used partly to care for necessary miscellaneous activities, such as opening exercises, passing, dismissals, lunches (mid-session), etc., and partly to extend some subject periods.

It should be understood that many correlations and integrations are recommended throughout Part Three. The use of these will often make it advisable to combine time-allotments.

**TIME SCHEDULE.**

<b>Subject Groups.</b>	Grade IV	Grade V	Grade VI
1. Language Arts.			
Reading Skills .....	15%	10%	10%
Language. Incl. literature, speech, spelling, penmanship, oral and written expression, vocabulary work, library periods, etc. ....	15%	20%	20%
2. Arithmetic. Includes drill on facts and processes, arithmetic understandings, and units. Arithmetic also appears in many other activities, and should be recognized and developed.....	15%	15%	15%
3. Physical Education .....	10%	10%	10%
*4. Social Studies .....	13%	13%	13%
*5. Science .....	8%	8%	8%
*6. Health .....	4%	4%	4%
7. Music and Art.			
Art, and some phases of music, often may be correlated with other activities .....	10%	10%	10%

\*The time allotment includes time for cultivating certain reading, language, and art skills and interests.

**PROGRAMS.**

It is possible and sometimes desirable to abandon a fixed daily program and to use instead a weekly time schedule, in order to allow occasionally for longer periods for such activities as excursions or construction. However, many teachers will prefer a basic daily program. Such a program is entirely feasible even for informal work, provided it is made up in large time blocks and can be changed when necessary.

**PLANNING AND PLAN-BOOKS.**

Programs of work such as those suggested call for more efficient planning than do the usual formal schedules. The teacher will make a plan for each unit in which she will block out her general outline for the unit study, collect material, and indicate expected procedures. This unit-plan may cover a period of days or even weeks. It should be incorporated in her regular plan-book and be the basis of her daily planning.

**CHAPTER VII.****RADIO-AUDIO-VISUAL AIDS**

Radio-Audio-Visual Aids are familiar terms in the realm of education. Long ago educators realized the value of visual enrichment, but today with sound motion pictures, the radio, and now television, which combines both hearing and seeing, teaching may be even more meaningful and advantageous.

The mere showing of any one of these aids does not in itself mean effective learning enrichment. The teacher herself must understand how to evaluate and select whatever aid is best suited to the purpose of the lesson.

The Office of Radio-Audio-Visual Aids, Division of University Extension, Massachusetts Department of Education, is set up to assist the teacher in such selection and is prepared to advise with any school community in the Commonwealth in the development of an effective program.

A studio is open in the State Education Building at 200 Newbury Street between 1:00 and 5:00 p.m. each school day. Here teachers may preview films, transcriptions, and recordings and examine the best in equipment. The regular offices of the Radio-Audio-Visual section on the third floor of the State Education Building are open each school day from 9:00 to 5:00.

Catalogues describing films, recordings, and transcriptions are available upon request.

If it is impossible to visit the office, films and other aids will be mailed to any school in the Commonwealth upon presentation of an order.

**Arithmetic.**

- Ar. 1. Teen Numbers (Young America) 10 minutes.
- Ar. 2. Parts of Nine (Young America) 10 minutes.

**Art.**

- A 3. Arts and Crafts of Mexico (EBF) 10 minutes.
- A 5. Hopi Arts and Crafts—COLOR—(Coronet) 10 minutes.
- A 6. The Making of a Mural—COLOR—(EBF) 10 minutes.
- A 9. Color in Clay—COLOR—(British Information Services) 10 minutes.
- A 10. Looking through Glass (British Information Services) 20 minutes.

**Fiction.**

- F 1. Adventures of Chico—(Pictorial) 58 minutes.

**Health.**

- H 10. For Health and Happiness—COLOR—(United States Department of Agriculture—Castle) 10 minutes.

**Language Arts.**

- L 1. Choosing Books to Read—COLOR—(Coronet) 10 minutes.
- L 2. The Library of Congress (Office of War Information—Castle) 20 minutes.
- L 3. Know Your Library (Coronet) 10 minutes.
- Li 3. Huckleberry Finn. 38 minutes.

**Music.**

- M 1. The String Choir (EBF) 10 minutes.

- M 2. The Woodwind Choir (EBF) 10 minutes.
- M 3. The Brass Choir (EBF) 10 minutes.
- M 4. The Percussion Group (EBF) 10 minutes.
- M 5. The Symphony Orchestra (EBF) 10 minutes.

### **Nature.**

- N 1. Leaves (EBF) 10 minutes.
- N 2. Flowers at Work (EBF) 10 minutes.
- N 3. Fungus Plants (EBF) 10 minutes.
- N 4. Gardening (EBF) 10 minutes.
- N 5. The Frog (EBF) 10 minutes.
- N 6. Beach and Sea Animals (EBF) 10 minutes.
- N 7. Tiny Water Animals (EBF) 10 minutes.
- N 8. Butterflies (EBF) 10 minutes
- N 9. How Nature Protects Animals (EBF) 10 minutes.
- N 10. Thrushes and Relatives (EBF) 10 minutes.
- N 11. Poultry on the Farm (EBF) 10 minutes.
- N 12. Farm Animals (EBF) 10 minutes.
- N 14. Trees for Tomorrow (on loan, American Forest Products Industries) 20 minutes.
- N 15. The Robin—COLOR—(Heidenkamp) 10 minutes.
- N 16. The Wood Thrush—COLOR—(Heidenkamp) 10 minutes.
- N 17. The Bluebird—COLOR—(Heidenkamp) 10 minutes.
- N 18. Realm of the Wild—COLOR—(United States Department of Agriculture—Castle) 28 minutes.
- N 19. Birds in Winter—COLOR—(Coronet) 10 minutes.
- N 20. Gray Squirrel (EBF) 10 minutes.
- N 21. Flower Growth—COLOR—Coronet 10 minutes.
- N 22. Bird Migration—COLOR—(Heidenkamp) 11 minutes.

### **Safety.**

- Sa 2. Safety to and from School (Young America) 10 minutes.

### **Science**

- Sc 17. How We Get Our Power (Young America) 10 minutes.
- Sc 18. The Solar Family (EBF) 10 minutes.
- Sc 19. The Moon (EBF) 10 minutes.
- Sc 20. Story of Electricity (Knowledge Builders) 10 minutes.
- Sc 22. Our Common Fuel (Coronet) 10 minutes.

### **Social Studies.**

- So 2. Our Earth (EBF) 10 minutes.
- So 3. Development of Transportation (EBF) 10 minutes.
- So 4. Animals in Modern Life (EBF) 10 minutes.
- So 5. Colonial Williamsburg (EBF) 10 minutes.
- So 6. Know Your Money (FBI) 20 minutes.

- So 7. Colonial Children (EBF) 10 minutes.
- So 8. Making Cotton Clothing (EBF) 10 minutes.
- So 11. Wool (From Sheep to Clothing) (EBF) 10 minutes.
- So 14. Mr. Bell (on loan, N. E. Tel. & Tel.) 20 minutes.
- So 15. Rehearsal (on loan, N. E. Tel. & Tel.) 20 minutes.
- So 16. The Telephone Hour—Josef Hoffman (on loan, N. E. Tel. & Tel.) 20 minutes.
- So 17. The White House (March of Time) 18 minutes.
- So 22. Party Lines—COLOR—(on loan, N. E. Tel. & Tel.) 20 minutes.
- So 24. Just Imagine (on loan, N. E. Tel. & Tel.) 10 minutes.
- So 28. Johnny Learns His Manners (Pictorial) (EBF) 20 minutes.
- So 30. Spanish Children (EBF) 10 minutes.
- So 31. British Isles (EBF) 10 minutes.
- So 32. Making Shoes (EBF) 10 minutes.
- So 33. Irish Children (EBF) 10 minutes.
- So 34. The Airport (EBF) 10 minutes.
- So 35. Democracy (EBF) 10 minutes.
- So 36. The Story of Christopher Columbus (EBF) 20 minutes.
- So 39. Kentucky Pioneers (EBF) 10 minutes.
- So 40. Patty Garman: Little Helper—COLOR—(Frith) 10 minutes.
- So 41. Our Foster Mother the Cow—COLOR—(Frith) 10 minutes.
- So 44. Land of Liberty. 50 minutes.
- G 1. Land of Mexico (EBF) 10 minutes
- G 2. New England Fishermen (EBF) 10 minutes.
- G 3. The Wheat Farmer (EBF) 10 minutes
- G 4. Navajo Indians (EBF) 10 minutes
- G 5. Argentina (People of Buenos Aires) (EBF) 10 minutes.
- G 7. Holiday Island—COLOR—(on loan, National Film Board of Canada) 10 minutes.
- G 8. Highland Holiday—COLOR—(on loan, National Film Board of Canada) 20 minutes
- G 9. Rocky Mountain Trout—COLOR—(on loan, National Film Board of Canada) 20 minutes
- G 10. Seaside Holiday—COLOR—(on loan, National Film Board of Canada) 10 minutes.
- G 12. Family Outing—COLOR—(on loan, National Film Board of Canada) 20 minutes.
- G 13. You'll Take the Highroad—COLOR—(on loan, National Film Board of Canada) 20 minutes.
- G 14. Modern Hawaii — COLOR — (Coronet) 10 minutes.
- G 15. Peoples of Canada (International Film Board) 20 minutes.
- G 16. Happy Valley—COLOR—(on loan, National Film Board of Canada) 10 minutes.
- G 17. In and Around Amsterdam—COLOR—(Nu-Art Films) 10 minutes.
- G 18. Global Concept in Maps (Coronet) 10 minutes.
- G 25. Alaska: Story of a Frontier (Films, Inc.) 22 minutes.



**PART TWO**

**OVERVIEW OF MATERIAL FOR GRADES 4, 5, 6**

**CHAPTER VIII****OVERVIEW OF MATERIAL FOR GRADES 4, 5, 6**

For easy reference, a topical summary of the work of each grade is here presented. In Part III, the full description of the units will be found under the subject-matter headings, where the progress in one field from grade to grade will be more apparent.

**OVERVIEW OF MATERIAL FOR GRADE 4.****SOCIAL STUDIES**

Note: History and geography are correlated. All grades share units in LIVING TOGETHER, CONSERVATION, and THE AIR AGE.

**Major Units:**

- Our Community.
- The Development of Massachusetts.
- Our New England, Then and Now.

**Sample Units:**

- How People Earn a Living by Manufacturing Goods.
- How People Travel, and Transport Goods.

**SCIENCE**

Biological Science: Plant and Animal Life of Various Familiar Communities (e.g., A Meadow Community; A Pond or Brook Community; The Community of the School Yard).

Physical Science: Identification of rocks and minerals found in the community, and the effects of weather upon our lives and those of animals and plants.

**HEALTH**

Units: Noon Lunch at School; Stoking Our Body Engines; Learning More About Milk; A Pleasing Smile; My Growth Chart

Away With the Fly; Keeping Your Cold to Yourself; Unseen Enemies; Community Health Services; Healthful Surroundings.

It Pays to Keep Clean.

**ART**

For this material, see the chapter "Art Education" in Part III.

**ARITHMETIC**

Understandings: Nature of Our Number System (continued); 175 Decade Addition Facts Needed for Carrying in Multiplication; 100 Primary Multiplication Facts; Multiplication Process Steps; 90 Primary Even Division Facts; Division by One-Place Divisor Using Long Division Form; Measuring Units and Equipment; Fraction Meanings as Needed; United States Money; Graphs.

**LANGUAGE ARTS, including READING**

For this material, see the chapters on these subjects in Part III.

**PHYSICAL EDUCATION**

Co-ordination and Power: Skill in Competitive Activities; Balance and Agility in Stunts; Growth in Use of Rhythms and Group Formations.

Socialization: Games; Learning to be Officials at Athletic Events; Experiences in Group Dancing.

Creativeness: Adapting Games to Situations; Inventing Rhythmic Movements.

## MUSIC

For this material, see chapter in Part III.

## SAFETY

For this material, see chapter in Part III.

## OVERVIEW OF MATERIAL FOR GRADE 5

## SOCIAL STUDIES

Note: History and geography are correlated. All grades share units in LIVING TOGETHER, CONSERVATION, and THE AIR AGE.

Major Unit: How the United States Was Settled by Pioneers (including many subordinate units).

Sample Unit: Building Goodwill through an Understanding and Appreciation of the Negro.

## SCIENCE

Biological Science: More Detailed Study of Selected Plants and Animals; Introduction to Classification. (Many units outlined; e.g., Spore Bearers; Animals with Backbones; Six-Leggers).

Physical Science: Soil and Water as They Affect Living Things; The Earth's Place in the Solar System; Machines; Heat; Light. (Many units outlined; e.g., Stars and Planets; How Nature Manufactures Rocks).

## HEALTH

Units: The Making of an Athlete; How Our Community Plays; Planning a Picnic; Hiking and Biking; Our Body Machine.

Why Sleep?; Hobbies.

How Our Eyes and Ears Work; Use and Misuse of Drugs; What We Should Know About First Aid; What Can We Believe?

Clothing for Every Climate.

Are You Good Company?; My Share in Making the Home; Keep Your Chin Up; Bringing Up Pets.

## ART

For this material, see the chapter "Art Education" in Part III.

## ARITHMETIC

Understandings: Continued Practice in Addition, Subtraction, Multiplication; Division with Two-Place or Easy Three-Place Divisor, when trial Quotient is True Quotient; Measuring Units (continued); Introduction to Manipulation of Common Fractions; United States Money; Graphs.

## LANGUAGE ARTS including READING

For this material, see the chapters in Part III.

## PHYSICAL EDUCATION

Co-ordination and Power: Skill and Strength in Competitive Games; Posture Improvement; Rhythmic Co-ordination.

Socialization: Officiating in Games and Contests; Running a Tournament or Field Day; Dancing, and Planning a Dance Festival.

Creativeness: Selecting Events, Planning Program, and Promoting Publicity for Field Day, etc.; Inventing Dances for Special Occasions, or for Class Use.

## MUSIC

For this material, see chapter in Part III.

## SAFETY

For this material, see chapter in Part III.

## OVERVIEW OF MATERIAL FOR GRADE 6.

## SOCIAL STUDIES

Note: History and geography are correlated. All grades share units in LIVING TOGETHER, CONSERVATION, and THE AIR AGE.

Major Unit: Our Neighbors to the North and South (The Americas).

Sample Units.

United States and Canada.

Mexico and Her People.

Living in the Middle Andean Countries.

## SCIENCE

Biological Science: Identification and Classification Continued. Economic Value of Certain Plants and Animals. (Many units outlined; e.g., A Tiny Soil Conditioner; Beneficial Bacteria, Molds, Fungi; Control of Pests).

Physical Science: One-third of Science time given. Topics: Chemistry in the Home; Fire; Electricity; Air Pressure and Devices Dependent upon It; Great Scientists.

## HEALTH

Units: Food and Successful Living; What Happens to the Food We Eat; Biting Facts; Getting the Most for Your Money; I Know Better Than That; Our Health—An Asset to Our Nation.

Friends or Enemies; Fighting Communicable Diseases; My Yearly Health Examination.

Use and Misuse of Drugs.

What Am I Worth to My Employer?

What Makes a Hero (in Athletics and in Science)?; Our World Needs Good Sports.

Making the Most of Your Appearance.

## ART

For this material, see the chapter "Art Education" in Part III.

## ARITHMETIC

Understandings: Introduction to Meaning of Decimals; Growth in Addition, Subtraction, Multiplication Skills; Division with Two-Place Divisor When Trial Quotient is Not True Quotient; Measuring Units; Addition and Subtraction of Fractions and Mixed Numbers (continued); United States Money; Consumer Education; Work with Decimal Fractions.

## LANGUAGE ARTS including READING

For this material, see the chapters in Part III.

## PHYSICAL EDUCATION

Co-ordination and Power: Skill and Strength in Competitive Games; Posture Improvement, Rhythmic Co-ordination.

Socialization: Officiating in Games and Contests; Running a Tournament or Field Day; Dancing, and Planning a Dance Festival.

Creativeness: Selecting Events, Planning Program, and Promoting Publicity for Field Day, etc.; Inventing Dances for Special Occasions, or for Class Use.

## MUSIC

For this material, see chapter in Part III.

## SAFETY

For this material, see chapter in Part III.

**PART THREE****CURRICULUM GUIDES IN SEPARATE SUBJECTS**

**CHAPTER IX****ARITHMETIC**

	Page
<b>Introduction</b> . . . . .	36
What Arithmetic is Not.	
Contributions of Arithmetic to General Objectives.	
Specific Mathematical Objectives.	
Development of Objectives	
<b>Overview</b> . . . . .	52
Chart for Grades 1 to 6.	
The Experience Program in Grades 4 to 6.	
Importance.	
Consumer Education Viewpoint.	
Interrelation of Arithmetic and Other Subject Matter Areas.	
Summary of Reports of Arithmetic Activities.	
List of Units.	
Enrichment and Visual Aids.	
The Teaching of Denominate Numbers in Grades 4 to 6.	
<b>Material by Grades</b> . . . . .	80
<b>Grade 4</b> . . . . .	80
Subject Matter Areas and Objectives—Chart.	
Planned Instruction in Subject Matter Areas.	
Understanding, Reading, and Writing Numbers.	
Addition.	
Subtraction.	
Multiplication.	
Division.	
Meaning of Common Fractions.	
Business Forms.	
Graphs.	

<b>Grade 5</b> . . . . .	96
Subject Matter Areas and Objectives—Chart.	
Planned Instruction in Subject Matter Areas.	
Understanding, Reading, and Writing Numbers.	
Maintenance and Remedial Procedures for Addition, Subtraction, and Multiplication.	
Division.	
Addition of Common Fractions with Related Denominators.	
Subtraction of Common Fractions with Related Denominators.	
Multiplication of Common Fractions.	
Business Forms.	
Graphs.	
<b>Grade 6</b> . . . . .	108
Subject Matter Areas and Objectives—Chart.	
Planned Instruction in Subject Matter Areas.	
Understanding, Reading, and Writing Numbers.	
Maintenance and Remedial Procedures in Addition, Subtraction, Multiplication, and Division.	
Division.	
Addition of Common Fractions with Unrelated Denominators.	
Subtraction of Common Fractions with Unrelated Denominators.	
Multiplication of Common Fractions.	
Division of Common Fractions.	
Meaning of Decimal Fractions.	
Addition and Subtraction of Decimal Fractions.	
Multiplication of Decimal Fractions.	
Division of Decimal Fractions.	
Meaning of Percentage.	
Business Forms.	
Graphs.	
<b>Bibliography</b> . . . . .	122

## INTRODUCTION

### WHAT ARITHMETIC IS NOT.

The term **elementary mathematics** has been used recently by authors of curriculum materials in an effort to broaden the thinking of their readers with respect to the objectives and content of arithmetic for Grades 1 to 6. The committee, after considering "What Arithmetic Is", decided to indicate some of the things which arithmetic is not. Hence the following.

#### **Arithmetic Is Not An Isolated Subject.**

The teacher who, because she was teaching arithmetic at the time, could not send children to the window to see live specimens of a bird "taught" the previous day, is not typical of today's teacher, to whom subject matter boundaries are no longer more important than the child. Most educators agree that planned periods need to be set aside for developing understandings, skills, and judgments. This planned instruction will be motivated and implemented by the use of units in other subject matter fields and by service jobs; e.g., selling milk and savings stamps, preparing refreshments, etc. On later pages are listed summaries of reports of arithmetic activities. These pages provide an impressive argument for integration vs. isolation.

#### **Arithmetic Is Not Mere Computation.**

Many of the quantitative situations which arise during the day require no computation. Some of these non-computational situations require the recognition or repetition of numbers or the remembering of times and places. Examples of this very simple use of numbers, include such things as telephone numbers and addresses; radio schedules, time tables; notices of time, place, cost, reply deadline for a social event; theatre time and seat numbers; prices of articles which must be bought; volume, page and date references; room numbers; recipes; etc.

Other non-computational situations require the exercise of judgment. Daily experiences may include the estimating of measurements; e.g., water for cooking vegetables, size of ice box dish needed for leftovers, size of paper for wrapping a package, nearness to gasoline pump, distances between places, number of apples, tomatoes, oranges, bananas, etc., in a pound. The approximate number of objects or persons in a group may also be estimated; e.g., attendance at any social function, number of pairs of scissors or of sheets of paper needed.

Judgment may also be required in reading or listening in order to gain maximum significance; quantitative situations may arise in printed advertising or news content or in radio programs. Examples of the first include advertisements of plaid gingham reduced from \$1.49 to 69¢, and of best pork chops at 59¢ a pound. Our appreciation of the seriousness of an accident reported in the news is based on the number of victims.

#### **Arithmetic Should Not Be Concerned Solely With The Development Of Skills.**

The growth of concepts and understandings, and of judgment, is necessary if arithmetic is to function in the everyday lives of individuals. It is therefore as desirable to set up knowledge and judgment objectives as to provide for the development of skills.

#### **Arithmetic Should Be Presented As A System, Not As An Aggregation Of Isolated Facts.**

Arithmetic should not be presented as an aggregation of isolated and sometimes meaningless facts to be memorized to the point of mastery, but rather as a system to be understood if real thinking in quantitative situations is to take place. The newer psychology of arithmetic emphasizes the development of rich understandings, not meaningless habituation. This meaningful approach to arithmetic teaching is difficult for those teachers whose learning and teaching experiences have consisted chiefly of drill. There are four major reasons for this.

In the first place, these teachers do not understand the principles underlying arithmetic, not because of stupidity, but because of lack of acquaintance. Only recently have authors of



arithmetic texts for teachers and of magazine articles begun to stress these underlying principles.

In the second place, developing genuine understanding on the part of children requires a much higher type of teaching technique than is required to carry on drill. Guiding children through the manipulation of wisely chosen objective materials to the formation of generalizations resulting from insight is no mean task; telling the answers takes much less patience than letting children discover them. Some teachers, in their concern over their inability to see immediate results and over the apparent disorder of an informal work period, develop a feeling of insecurity; to them the tangibility of a set of papers to be corrected is comforting.

In the third place, the provision of worthwhile objective materials is taxing to the ingenuity of the teacher. The equipment being sold by publishing houses is at present expensive. Film strips and motion pictures are not wholly adequate or easily accessible to classroom teachers.

In the fourth place, standardized tests, which constitute the customary evaluation of the results of arithmetic teaching, still emphasize skills. A teacher fears to spend her precious time developing concepts and judgments lest her children fall below the grade norm on these standardized computation tests.

While frankly recognizing the teacher's plight, we feel that a very constructive approach can be offered to her problem.

### **Suggestions to the Teacher.**

1. Read for viewpoint any one of the recent professional books on the teaching of arithmetic; these emphasize meaning.

2. Select only one area of your own work for initial study. Read about that area in books and in that section of the Curriculum Guide devoted to it. Review several of the recent pupil texts and their accompanying manuals to see how the meaning phases are developed.

3. Try with the help of the above reading to isolate the specific understandings desirable for the children.

4. Study sources of equipment and objective materials. Get an idea of the types of things needed and enlist the aid of the children in supplying "reasonable facsimiles." There is danger, of course, that the drive for the use of objectives in the development of meaning will result in flooding the educational market with "gadgets". However, with growth on the part of the teacher will come more critical evaluation of materials, her own and those for sale commercially.

5. Examine anticipated classroom experiences and the units in other subject matter fields for occurrences of the area of arithmetic in which you are interested.

6. Experiment with informal tests designed to discover the presence of understandings or judgments. Attempts to frame test questions of this sort will increase (a) your understanding of teacher as well as child difficulties, (b) your ability to make evaluation results guide teaching procedures, (c) your appreciation of the difficulties besetting professional test makers, and (d) your judgment in selecting suitable commercial tests.

7. When you have begun to see results of teaching for development of meaning and judgments, share your findings with your principal, supervisor, and superintendent.

8. Don't worry about the standardized achievement test coming in May or June. If you have really helped children to understand the principles underlying their computation, their test results should not suffer. By the time you are really proficient in developing knowledge and judgment, it is to be hoped that test makers will have devised ways for evaluating these learnings.

### **Arithmetic Should Not Be Taught As An End In Itself.**

Arithmetic should not be taught as an end in itself but for the contribution which it renders to the general objectives of education.

### CONTRIBUTIONS OF ARITHMETIC TO GENERAL OBJECTIVES OF EDUCATION.

In the change of emphasis from teaching subjects to teaching children, we have developed a technique for using the subject matter as a tool whereby we not only teach the three R's but develop the child himself. This change is particularly noticeable in arithmetic teaching. Whereas arithmetic was once an isolated subject, consisting chiefly of tiresome repetition and drill, it is now closely correlated with all other learnings. It adapts itself especially well to developing and stressing social and civic responsibilities.

Children of pre-school age unconsciously absorb some knowledge of the way in which their parents use arithmetic in their everyday lives. The alert and successful teacher of Grades 1 through 3 co-ordinates this knowledge which the children have unconsciously acquired, arouses their curiosity, and gives them some elementary training in the use of numbers. The teachers of the next few grades have the task of keeping these children interested and curious. This can be done by supplying plenty of books and other materials and teaching children how to find out what they want to know, thus making them more independent in their thinking, more self-reliant, more reliable, and increasingly confident in their own powers. Even children in Grades 4 through 6 are not too young to be led to appreciate the influence arithmetic has had on the development of the race and its usefulness as a mode of thinking.

In the field of human relationships, the newer ways of teaching arithmetic have shown children that a co-operating group performs a task much more easily than a single individual; that every child in the group can be kept busy and contented; and that he will learn more than he would in a school run on more old-fashioned lines. This group presentation of material automatically creates situations in which each child has an opportunity to help his neighbor, to see that there is more than one side to any question, to work for the well-being of the group as a whole, and when downed in an argument to continue to do his best to help. He practices courtesy and kindness. He develops not only a power of leadership but the equally necessary ability to follow a leader. Units of work relating to planning meals, buying food, buying clothes, saving, carrying on a business venture in salesmanship, etc., offer opportunities for the school to co-operate with the home. A wise teacher can increase the children's appreciation of their homes and of what their parents do for them.

The best mathematical background for economic efficiency is accuracy and good judgment in the use of the fundamental processes with integers, common and decimal fractions, and a working knowledge of measuring units. Groups of lessons based on children's personal allowances can stress wise spending and saving and thus contribute to a worthwhile knowledge of the practical use of arithmetic. Well planned buying may be fostered through activities such as a candy sale, the making of gifts, the making and selling of cookies, a sale of vegetables raised in the children's own gardens. A committee, empowered by the class to buy needed materials for use in preparing and serving refreshments, should learn what goods are in the markets and at what prices in the various stores and then keep within their budget, a step toward learning to live within one's means. Teachers should help children learn to appreciate good quality in what they buy. There are too many adults who have never learned that low-priced goods are not always poor in quality and that high-priced ones are not necessarily the better.

The child, if he is to become a worthwhile citizen, should learn to respect honest difference of opinion, to give due heed to the rights of others, to co-operate effectively in a joint enterprise, to become self-reliant and dependable. If a child is encouraged to progress in his school work at his own best rate, he will assume part of the responsibility for decisions affecting his advancement, a commendable habit too often neglected and feared by adults.

## SPECIFIC MATHEMATICAL OBJECTIVES.

### Outline.

- I. A wholesome attitude toward arithmetic on the part of the child
  - A. Feeling that arithmetic is useful through
    1. Broad interpretation of arithmetic by the teacher.
    2. Integration of arithmetic with the curriculum as a whole.
  - B. Feeling that success is possible through teacher planning
    1. Reasonable selection of subject matter topics.
    2. Optimum grade placement.
    3. Distinction between topics whose use warrants mastery and optional materials taught for appreciation or introduced in a given grade with complete mastery deferred to a later period.
  - C. Catching the enthusiasm of the teacher
  
- II. Growth in knowledge and understanding through
  - A. Selection of materials and methods for developing meanings.
  - B. Provision for continuous growth in number concepts from year to year.
  
- III. Growth in mathematical skills. Effective computation requires
  - A. Accuracy
    1. Desirable attitude toward accuracy.
    2. Presentation of facts and process steps with emphasis on prevention of error.
    3. The right kind of drill for the child who needs it.
      - a. Is drill the most effective technique?
      - b. Are children ready?
      - c. Is specific purpose for this drill evident?
      - d. For what stage of learning is drill planned?
      - e. Is drill content socially useful?
      - f. Is drill being given to the child who needs it?
      - g. Is the time being spent on the element needing drill?
    4. Effective checking habits.
    5. Well-planned corrective program.
    6. Plan for child responsibility for accuracy.
  - B. Reasonable speed.
  - C. Facility in use of tools of arithmetic resulting in
    1. Computation without use of crutches.
    2. Computation by inspection.
    3. Use of short methods.
    4. Discovery of alternate ways of obtaining solutions.
  
- IV. Growth in judgment in quantitative situations.
  - A. Desirable attitude toward judgment.
  - B. Provision for the exercise of judgment.
    1. In situations involving no computation.
    2. In situations requiring computation.

## DEVELOPMENT OF OBJECTIVES.

### A Wholesome Attitude Toward Arithmetic.

A wholesome attitude toward arithmetic is promoted when the child feels (1) that arith-

metic is useful, (2) that success for him is possible, and (3) that the teacher is enthusiastic about the subject.

### **Usefulness of Arithmetic.**

The development of the feeling that arithmetic is useful depends upon the (1) interpretation of arithmetic and the (2) relating of arithmetic to the curriculum as a whole.

### **Interpretation of Arithmetic.**

The desirability of broadening the content of arithmetic to include non-computational as well as computational situations has already been discussed.

**The relation of arithmetic to the curriculum as a whole.** It is not necessary to choose between complete integration in which arithmetic loses its identity and complete isolation in which the emphasis is upon computation seemingly as an end in itself. The problem is to decide the relative emphasis to be given each factor. The teacher must know what kind and amount of arithmetic is necessary in the development of a unit, and what profitable use can be made of it.

Attempts to organize instruction around the number needs arising in the unit have met with little general success, especially beyond the first two grades. This is true because there is no control over the range of subject matter or the frequency and order of occurrence of processes in a unit. On the other hand, the subject matter approach has often resulted in the introduction of meaningless and unrelated problems merely to illustrate the use of a process.

The plan employed here provides for the development of meanings, skills, and judgment growing out of logically organized subject matter. Units are selected which will further the all round development of the child. The arithmetic needs growing out of the unit will be an important but by no means the sole factor in its selection. There should be enough flexibility in the organization of subject matter to permit the best use of the unit. For example, a certain phase of measuring should be taught when the need arises in experience, not when a certain textbook page is reached.

Satisfactory interrelation of unit and planned instruction will have the following results:

1. The place of arithmetic in the whole learning pattern will be made clear.
2. The need for learning a new step or process or for further drill will be evident.
3. Numerous opportunities for measuring will arise.
4. Problem-solving units will lead to the development of judgment.

### **Possibility of Success.**

The feeling that success is possible may result from (1) a reasonable selection of topics, (2) an optimum grade placement of these topics and (3) a distinction between topics whose use warrants mastery, and optional materials taught for appreciation or introduced in a given grade with complete mastery deferred to a later period.

**Selection of subject matter..** When grade placement of subject matter in mathematics for the elementary and junior-senior high school levels has not been planned by the same committee, the selection of materials for the first six grades must be carefully made to avoid both the temptation to postpone too many topics to Grades 7 and 8 and the opposite tendency to assign more work for the first six grades than can adequately be taught.

In this outline, social usage has been the basis of selection. Possible concern about the so-called "simplified program" is based on the anticipated criticism from the junior and senior high schools. Teachers of the elementary grades, therefore, should accept the responsibility for sending into the seventh grade children who have mastery of the facts and processes of addition, subtraction, multiplication, and division of integers, an understanding and working knowledge of the socially useful processes with common and decimal fractions, an understanding of percentage, and skill in measuring and estimating. Teachers in junior high schools prefer that children be well taught a limited number of processes rather than that they should be "exposed" to such a

quantity of material that erroneous and inadequate comprehension, poorly developed skills, and lack of judgment are bound to result. With a resulting minimum need for corrective work required in Grades 7 and 8, time will be available for teaching the new processes.

**Optimum grade placement of subject matter topics.** Educators everywhere are saying to teachers, "You must take the child where you find him and carry him as far as his ability permits." In some cities, attempts are being made to provide for continuous promotion on learning levels rather than on grade levels. The committee believes that the ideal plan is to list for the first six grades, units of work which provide opportunities for number growth, to suggest concepts to be developed, computation skills to be mastered, judgment to be encouraged, and appreciations which will enrich the child's experiences, and to say to the teachers of these grades, "Find out what knowledge and skills are possessed by the children when they come to you and continue their growth."

The teacher who is thinking in terms of continuous child growth will then feel free to ignore grade boundaries. The needs of the more conventional and of the inexperienced teacher have led the committee to offer a specific grade placement. This grade placement has taken into consideration the grade in which arithmetic is to be begun, the grade in which drill procedures are to be introduced, the topics for emphasis in each grade and the continued growth in these topics from year to year.

Some learnings may be more effectively gained through experience than through drill. For example, growth of number concepts, of common fraction meanings, and of skill in measuring, come through experience. On the other hand, the mastery of facts and of their use in processes requires drill. We need not choose the one and reject the other; rather we must know when learning through experience and when drill will be more effective.

Two courses are open to those who plan the grade placement of subject matter in a course of study in arithmetic; viz., (1) to defer some of the topics to later grades taking advantage of the increased mental maturity of the child and his growing need for the subject matter or (2) to find improved means for teaching the subject at the traditional grade level. This latter course may be the way of the future, but the available evidence leads the committee to encourage adoption of the former course, viz., deferring topics to later grades.

The overview chart (later) shows the placement of subject matter for the first six grades.

Continuous child growth requires provision for the continuance of arithmetic topics in grades where emphasis is no longer placed on them. This placement provides for maintenance of skills and their application to more difficult examples, and to other processes; for growth in understanding and in maturity of work habits. Provision for this continuance has been indicated in the overview chart.

**Distinction between materials to be mastered, optional topics for appreciation, and topics introduced without mastery in a given grade.** Facts and processes used in daily life need to be mastered. There are several processes, however, for which so little use is found in general daily adult living that the time required for overlearning them to the extent that mastery may be retained despite disuse, seems unwarranted. Such topics have been indicated for optional work. For example, the complete understanding of decimal fractions and mastery of computation with them as well as meaning and computation in percentages are introduced in this plan in Grade 6; they are not indicated for mastery.

### **The Teacher's Enthusiasm.**

The teacher is always a major factor in determining the attitude of a child toward any subject. One who enjoys arithmetic herself and is competent to teach it will create a dynamic atmosphere. Mathematically-minded children working with her will find their own interests intensified, while children who might otherwise do mediocre or poor work will find themselves carried along by this teacher's enthusiasm.

On the other hand, the teacher who has always said, "I'd rather teach anything else than arithmetic," will find that the time devoted to the preparation of an enriched program will be rewarded by a new enthusiasm for arithmetic.

## GROWTH IN KNOWLEDGE AND UNDERSTANDING

The development of adequate mathematical concepts depends upon (1) the teacher's understanding of the significance and the objectives in teaching mathematical meanings, (2) the careful selection of materials and methods for developing meanings, and (3) provision for continuous growth from year to year.

### **Teacher's Understanding of the Significance and the Objectives in Teaching Mathematical Meanings**

According to Spitzer<sup>1</sup> "The meaning theory, then, is characterized by the viewpoint that arithmetic can be learned most easily if children see sense in what they do and if arithmetic is taught as a closely knit system of related ideas, facts, and principles." He further states "The major effects that this theory has had on teaching are that it has (1) increased the emphasis given to concept-building; (2) increased the use of concrete and semi-concrete materials; (3) stimulated the recognition of the value of relationships in arithmetic; (4) stimulated attempts to teach the system of number rather than separate elements of knowledge; and (5) emphasized having children see reasons for the work they do in arithmetic."<sup>1</sup>

**Materials and Methods for Developing Meaning.** Arithmetic meanings are not transmitted from teacher to child solely by the use of linguistic or numerical symbols. Nor do meanings result from imitation. Children must experience number situations arising in every day activities or in units. They must be encouraged to see and handle real objects before they are led, through the use of pictures and of semi-concrete materials, to the use of symbols. Teachers in all grades should build up a varied collection of materials to be used to supplement experience when they are introducing or extending number concepts.

Arithmetic meanings are not the result of drill, which, as we have pointed out, is a learning technique for establishing skills, not a way of developing meanings.

**Provision for Continuous Growth in Number Concepts.** Growth in understandings does not occur over night. Every teacher is responsible for ascertaining what stage of concept development has been reached by the children in her grade and for providing for continued growth.

Teaching in the lower grades should anticipate the development of meanings which will follow in later grades. For example, the nature of the number system should be understood so far as the child is able to comprehend it. The place or positional value, and the decimal features, as well as the significance of zero as a place holder, can be understood by many children before the close of the sixth grade. Early teaching should prepare also for the concept of the inexact nature of measurement. Concepts should be taught in their precise, albeit simplified, form, to avoid erroneous beliefs which tend to block later learning.

## GROWTH IN MATHEMATICAL SKILLS.

Efficient computation requires not only (1) accuracy but (2) desirable work habits. Accuracy in computation can be greatly furthered by (a) a desirable attitude toward accuracy on the part of the child, (b) the presentation of facts and process steps with emphasis on the prevention of error, (c) the right kind of drill for the child who needs it, and (d) a well-planned corrective program whenever needed. Work habits include (a) reasonable speed, (b) effective

1. Spitzer, Hubert F. *The Teaching of Arithmetic*, Houghton Mifflin Co., Boston, 1948. p. 9.

1. *Ibid*, page 10.

checking habits, (c) child responsibility for accuracy, (d) work without crutches, and (e) mental computation.

### Accuracy.

**Attitude toward accuracy.** Can children be made to appreciate the need for accuracy? Can the teacher help children to acquire an attitude of confidence based on skill in computation? As one teacher has aptly put it, "A child has a right to know and to know that he knows". Are there teachers who still give part credit, if in the solution of a problem the method is correct although the computation is not? The child must realize that an answer is either right or wrong, and that only right answers are acceptable in the business and social world.

**Presentation of facts and process steps.** Much can be accomplished in securing accuracy through (1) building meanings before giving drill; (2) organizing facts and process steps into reasonable tasks; (3) rationalizing the step-by-step procedures insofar as rationalizations are helpful; (4) anticipating difficulties and working to prevent them; and (5) calling attention at each step to the reasonableness of results.

**Drill.** Perhaps no phase of instruction needs more careful examination than does drill. For the teacher who is interested in her own growth the following check list for the evaluation of drill lessons is offered.

1. Is drill a necessary step in the learning of this material? Drill or practice as here used is consciously planned repetition with the attention focused on the job of learning. Drill differs from learning through use in that the latter is composed of more or less unconscious and spontaneous repetitions where the focus is on the experience, not on the learning process.

2. Are the children for whom this drill is planned ready for it? Unless there is an adequate background of meaning, drill may be futile or even harmful.

3. For what specific purpose is this drill being given? Drill may be planned for memorization of facts, or the habituation of the order of performance in a process step. It may be used to develop some phase of a process step; e.g., estimating quotient figure or multiplying mentally in long division, or to establishing desirable work habits; e.g., checking computation, thinking instead of writing work whenever possible.

4. For what stage of learning is this drill adapted? Three stages may be recognized: (a) establishing the association, (b) attempting recall and (c) overlearning. Let us apply these stages to drill on a group of primary addition facts whose meaning has already been developed through use. The child copies the facts and their sums on to his individual flash cards, reads them aloud to check their accuracy, and hears them read aloud by others. After continuing these associating repetitions for some time he is ready to attempt to recall the answers. Those answers not recalled are studied further for association. Finally it appears that every answer can be recalled but practice continues in order to provide sufficient overlearning so that when normal forgetting has occurred the answer will still be associated with the facts.

5. Does the social utility of the subject matter included in the drill warrant the time devoted to its memorization? Many college students recall having been given drill in adding fractions with such denominators as 9 and 11, etc. However, these same students go through the whole process of adding

$$\begin{array}{r} 3/4 \\ 3/4 \\ \hline 6/4 = 1 \frac{2}{4} = 1 \frac{1}{2} \end{array}$$

knowing that  $3/4$  and  $3/4$  are  $1 \frac{1}{2}$ . Here as in much socially useful fraction manipulation, answers can be obtained by inspection. The more we limit drill to socially useful content, the more we can encourage and require the obtaining of results by inspection. There is not time in six years to teach everything. Content of drill must, therefore, be carefully selected.

6. Is the drill being given to the child who needs it? The teacher must be skilled in ob-

serving, interviewing, using inventory tests, and employing other means of determining what each child needs, for children entering any grade may range over as many as four grades in arithmetic ability. Groups for drill work should be flexible, constantly changing in accordance with the diagnosis of work. The teacher must begin at the level of accomplishment which had been reached and proceed from there. Material should be provided on all levels to meet individual and group needs. Provision should be made for the brighter pupils as well as for the slower ones by giving them harder work, extra work, and enrichment material such as reading on special topics under consideration, working on puzzles, etc. As errors vary with different children, the work must be planned for individuals or for groups having the same needs; we must stop drilling the few at the expense of the many.

Specific drill techniques suited to the subject matter will be suggested in the grade sections. Before closing the discussion here we shall mention the desirability of avoiding (1) the use of drill of the spelling match type in which the failing child is eliminated and (2) the overuse of drill in which teams select their own representatives who are likely to be the brightest children; i.e., those needing drill least.

Children may be grouped according to their abilities as shown by the results of an informal test. The child who is in one group for the first day or two should be moved to another as soon as he shows sufficient change. Occasionally the children may be allowed to make their own groups, each doing the thing he thinks he needs most. If one were to visit the classroom of an alert, skillful teacher, he might see two or three children working on the subtraction or multiplication needed in the long form of division, a few more on the long division form, others on zero difficulties. The leader of one group may be the boy who is potentially a trouble maker because he usually hasn't enough to do, another may be the quiet, retiring girl who has excellent ability but seldom has an opportunity to show it.

It is to be hoped that the needed practice will be demanded by the children; and it will be, if the teacher wants it sufficiently and plans well.

Each child should keep in a small notebook a record of the work on which he needs to spend more time. He should not erase these when he has in his opinion mastered them. Instead he may draw a light line through them and check later to see if his mastery has been maintained.

7. Is the maximum number of repetitions per pupil per minute being realized? Teachers who frequently give flash card drill on facts by exposing the card and calling on children at random for an oral response will do well to compare the number of repetitions resulting from this procedure with those resulting from written instead of oral answers. The teacher may argue that mental repetitions are taking place, but of this she can not be certain. The amount of time spent in calling the names of children and waiting for them to rise at their seats to respond orally is surprisingly great.

8. What is the basis for the child's interest in the drill lesson? Repetition will be effective only if the child is interested and alert. Drill should be enjoyable and inspirational, something to which children look forward, and something to be stopped while interest is at its height. The soundest motive is the child's own need for practice on the particular thing which he is doing. This need will be discovered in the use he is making of arithmetic in some purposeful work or will be disclosed upon examination of his work. In many cases drill on a recently presented process step may be preceded by practice upon the facts or other steps occurring in the new process. For example, work on column addition or in multiplication with carrying may be preceded by practice on the decade facts occurring in the examples. Long division practice may be preceded by drill on the mental multiplications and subtractions which will be found in the examples.

9. Is the time devoted to drill being spent upon the element needing drill? The placing of points in multiplication and division involving decimal fractions will receive a limited number of repetitions in a class period if each example must be solved first. In this case, examples



may be given in which the numerical answers are provided, thus allowing the drill time to be spent upon the correct placing of points. If a child finds difficulty in determining the quotient figure, he should not be expected to spend his time completing the solution of the example, but should be given practice planned specifically for correcting this weakness.

**A well-planned corrective program.** A successful corrective program calls for complete understanding between the teacher and pupils. Children guided by a skillful teacher will become aware of individual difficulties and needs. Through a cheerful attitude of "Let's do something about these mistakes", the teacher leads the children to feel the desire to improve their work.

Plans for corrective work include (1) a survey of the class, (2) analysis of pupil tests, (3) grouping for teaching and drill, (4) retesting and regrouping, and (5) drill for maintenance of skills.

**1. Survey of the class.** The survey should be carried as follows:

a. A carefully constructed diagnostic test containing a variety of examples covering the fundamental facts and process steps will make the child aware of his limitations and needs. The teacher may gain the confidence of the class by telling them that a diagnostic test is given "to find out what ails you", not for a mark in the teacher's record book. These tests should be carefully analyzed. From them the teacher should make individual record sheets listing the mistakes and confusions.

b. An interview with each child in the group helps to achieve the aims of the corrective program. Examples are selected for the child to figure aloud. This method will quickly show confusions and improper methods of work. A prepared list of process difficulties will help the teacher to check as the child works orally. Careful questioning may also reveal causes for confusions or dislikes for arithmetic.

c. An examination of school records will give the intelligence quotients, achievement and health records, and other data helpful in understanding individual pupils.

**2. Analysis of tests.** Pupils should be given the chance to analyze the examples that are wrong in order to determine the reason for the mistakes. If the children are unaccustomed to this procedure, the teacher will need to give considerable help at first. (An interview with the child at this point will be a helpful experience for the teacher unfamiliar with this plan of work.) Each child should have a special notebook in which to record the test, the process step difficulties encountered, and the mistakes in number facts.

**3. Grouping for teaching and drill.** Difficulties common to certain children should be the basis for class grouping.

Errors in computation are often due to incorrect ideas and meanings and these meanings must be retaught to a part or the whole of a class.

If members of the class need to review number facts, this may be done individually or in groups. The better pupils, trained by the teacher outside of class time, can be used effectively as group leaders. Suitable types of flash card drills and devices will be discussed in the subject matter sections.

In reteaching a process step to a group the teacher will need to select her methods carefully. Examples worked orally at the board may be left there as models until a group decides that they are no longer needed. For the group to experience success from the beginning, the practice exercises need to be few in number and should cover only one step at a time. It is advisable to correct the exercises during the period to discover difficulties still persisting. This correction of errors should be made immediately to avoid repetition of mistakes.

A series of work sheets covering the step difficulty may be made by the teacher. The correct solution of these exercises by each child will mark his progress. Interesting devices for motivation and drill should not be overlooked.

Individual progress and record charts kept by the teacher and pupils will serve as valuable evidence of improvement.

**4. Retesting and regrouping.** Tests should be given frequently to determine the progress made by a group, to show what further practice is needed, and what regroupings are indicated. Tests diagnosing specific step difficulties may be made by the teacher. If from the beginning the children have been conscious of the objectives of the program, they will welcome the tests to determine their readiness to begin new work.

**5. Drill for maintenance of skills.** Throughout the year the teacher must plan to provide practice exercises to maintain mastery of the number facts and process steps.

#### References for Corrective Procedures

- Brueckner, Leo J., *DIAGNOSTIC AND REMEDIAL TEACHING IN ARITHMETIC*, Philadelphia: The John C. Winston Co., 1930, p. 337.
- Hildreth, Gertrude H., *LEARNING THE THREE R's*. Philadelphia: Educational Publishers, 1936. pp. 610-647.
- Wilson, Guy M., et al., *TEACHING THE NEW ARITHMETIC*. New York: McGraw-Hill Book Company, 1939. pp. 394-400.
- Yarbrough, Dorothy, *A DIAGNOSIS OF PUPIL'S ERRORS IN ARITHMETIC WITH A VIEW TO CORRECTIVE WORK CARRIED ON THROUGH COOPERATION OF THE TEACHERS*. Masters Thesis. Boston: Boston University School of Education, 1938.

#### Work Habits.

**A plan for child responsibility for accuracy.** The following device for securing accuracy is based upon a plan suggested by several teachers

As a part of the daily arithmetic period, five exercises or problems are assigned. This number may vary if the time of work, the time available, or the ability of the class suggests it. The teacher passes from one child to another, examines his finished work, takes all correct papers labeling them "1", and checks with one mark all papers containing one or more errors. In no way does she indicate what the error is or where it is. When the child thinks he has found and corrected his errors, the teacher examines his paper, accepts it labeling it "2", or places another check mark beside the first. This procedure, which is continued a reasonable length of time, presupposes that the checking of each process has been practiced until the child is capable of independent work. This method, which is recommended for daily use in order to make accuracy a habit, should take less than ten minutes after pupils have become accustomed to it. On a card, which is kept for each child, is recorded the number of trials necessary to get a perfect paper.

**Reasonable speed.** Remembering that accuracy is of prime importance, the teacher must encourage the child to work at his own best speed. While this should be well above dawdling, it must be below that speed resulting in nervous tension.

Slow children may rarely attempt timed tests, but bright children may enjoy them and benefit from them.

**Mental computation.** Observation shows that adults in general are too prone to reach for pencil and paper for the simplest computation. The teacher will encourage mental solutions by pointing out how an answer is obtained and by giving practice periods in which the children try to obtain answers without doing written work. The faster working children especially should be encouraged to compute in this manner. Under the right conditions pride in this ability can be developed. The materials used for practice must conform to social use and not become gymnastics.

**Computation without use of crutches.** The use of crutches should be neither condoned nor condemned uncritically. Brownell<sup>1</sup> points out that the question of crutches, chiefly a matter of definition and identification at present, is to be settled by research and not opinion. On the basis of his experiment with a crutch in multiplication with fractions, he denies (1) that they tend to obscure the process; (2) that learning the use of crutches is as difficult as learning the process without them; (3) that they outlive their usefulness and become fixed as uneconomical habits; and (4) that they block learning by encouraging the learner to remain at a lower level of efficiency than he might otherwise attain.

The use of crutches should be adjusted to the needs of the learner. Even a gifted child may need them occasionally while the less gifted child may have to rely upon them to a much greater extent. However, that does not mean that their use is to be taught to the entire class. Here again, encouragement of pride in work without crutches is a constructive approach to their abandonment when no longer needed.

**Use of short methods.** Too frequently the teaching of short methods has meant a brief exposure to many procedures and an immediate relapse to the older habits. As soon as any process has been developed to the stage where the use of a short method is desirable, such a method should be learned and used.

**Discovery of alternate ways of obtaining solutions.** How many times in the traditional school has the bright child been penalized for solving a problem by a method differing from that of the teacher? This has tended to discourage thinking and to put a premium on habit. Pointing out varying ways of arriving at an answer and praising the efforts of a child who discovers another way will help to make facility in the use of arithmetic tools seem worthwhile.

**Effective checking habits.** Effective checking depends upon knowledge of checking procedures and a desirable attitude toward checking.

Methods of checking computation which have proved useful will be discussed in the sections devoted to the subject matter processes.

The attitude that checking is done as an extra task to please an insistent teacher should give way to the acceptance of it as a matter of course

## GROWTH OF JUDGMENT IN QUANTITATIVE SITUATIONS.

Growth of judgment in quantitative situations depends upon (1) the creation of a desirable attitude toward judgment and (2) provision for the exercise of judgment.

### **Desirable Attitudes Toward Judgment.**

These attitudes are obtained if a child is curious about number relations, if he likes to "guess", if he takes pride in seeing how well he can estimate, and if he has confidence in his own judgment.

### **Provisions for Exercise of Judgment.**

Provision for the exercise of judgment requires that the teacher recognize types of situations calling for judgment.

**Judgment in situations involving no computation.** Many of the number situations which are met during the day do not require computation, but do require judgment. Very often they are related to measurement. For example, the housekeeper decides whether the coffee will last until Saturday; estimates size to which pie crust must be rolled to fit pie plates; estimates thickness of cookies when recipe says  $1/8$  of an inch.

Judgment of distance, contents, weight, and time result from real measuring experiences followed by practice in estimating. We must provide for both the experience and the practice

1. Brownell, William A., "The Place of Crutches in Instruction", *Elementary School Journal*, 34: 607-619, April, 1934.

in estimating. From units of work, from reading in other subjects and from daily classroom activities will come many opportunities.

Number situations requiring judgment frequently relate to money. The selection or rejection of an item of food, a piece of wearing apparel, a restaurant meal, a theatre ticket, etc., often depends on the judgment of the buyer as to whether it can be afforded or is worth the price. Children will gain judgment in money situations through real experiences in buying and selling, in units of work, especially those of the service job or executive type.

These non-computational situations requiring judgment are extremely important and deserve more attention than they have generally received in school.

**Judgment in situations requiring computation (problem solving.)** This situation calls for the exercise of judgment at several points: (1) in the selection of information needed, (2) in the determination of process or processes and the order of their use, (3) in the critical check upon the reasonableness of the result. For example, in buying cookies for a party we (1) discover that five dozen are needed and the cost per dozen is 20 cents, (2) decide to multiply 20 by 5, (3) agree that \$1.00 is a reasonable answer and (4) find that the price is within the amount allowed from the food budget for this purpose.

Some advantage in the use of problems arising from units or from classroom activities are.

1. Such a problem is solved because the answer is significant.
2. The answer cannot be used until its reasonableness has been checked.
3. Since the answer is to be used, the computation leading to it must be based upon correct prices and quantities.
4. This information (e.g., prices, quantities, etc.) used in arriving at the answer, must be assembled.
5. The selection of the processes and the carrying out of the computation are a means to an end, not ends in themselves.
6. The selection of these processes is dependent upon an understanding of the situation, not upon reading and relating verbal symbols.
7. The problems are timely.
8. The solution of the problems adds to the understanding of the situation. For example, the problems growing out of the selection, purchase, and preparation of food for a party or picnic will result in something more than an exercise in arithmetic. Properly handled, they can provide greater understanding of our present day food problems.

The teacher who will check carefully the above points will be impressed with the enormous gains to the child in the use of the real problem-solving unit growing out of his experience.

The growth resulting from the use of real problems cannot be measured by tests consisting of traditional verbal problems. Instead, we must at present rely, to a great extent, upon observation of the child's behavior in life situations.

The solution of verbal problems taken from textbooks or formulated by the teacher may prepare the pupil to solve this type later in mathematics and science. In these the chief use of judgment comes in the reading and in the selection of processes and in the order of their execution.

## AN EFFECTIVE EVALUATION PROGRAM.

### **Purposes.**

The effective evaluation program sees to it that (1) the teacher becomes better acquainted with the child, and (2) that the child becomes better acquainted with himself in order to observe and promote his own growth.

The teacher's better acquaintance with the children is necessary in order that (1) their

interests and social development may influence her selection of informational materials and units; (2) their readiness for a new phase of subject matter may determine the time for introducing this process; (3) the degree of mastery of facts and process steps attained may indicate the nature and quantity of drill needed by individuals; and (4) their abilities may be a guide in the planning of enrichment materials for the rapid workers and for remedial procedures for the slower learners.

The results of tests and other evaluation devices provide information for both teacher and children. As children see a relation between any form of test and the work which follows it and become interested in their own growth, the test becomes a really valuable teaching instrument.

### **Evaluation Techniques.**

By techniques, we refer to (1) tests and (2) other means for determining growth such as interviews, observation, children's expressed reactions, etc

Teacher-made tests. Inventory tests on facts may be administered in the following ways:

(1) Individually:

Teacher flashes card; child gives oral response.

Teacher points to printed fact; child gives oral response.

(2) Class:

Teacher flashes card; children write answers.

Children at their own pace write answers to printed facts.

The last plan, probably the most commonly used, cannot be well controlled, and the time allowed permits the use of counting and other devices for finding sums. Even if a time limit is used, the teacher cannot be sure whether the last few facts on incomplete papers were left unanswered because they were unknown or because earlier facts were counted, thereby consuming time. The results of such tests are bound to be misleading unless children can be taught to omit doubtful facts and write only those of which they are certain. Even then, the borderline between known and doubtful facts is not clear in the child's mind.

Diagnostic process step tests should be constructed so that (1) all types of examples being tested at the time are included and (2) the frequency with which facts occur in the test is controlled.

Objective-type tests may include the following:

(1) Matching tests; e.g., drawing line to connect equivalent fractions.

(2) Completion tests, used to discover meanings known by the children.

(3) Multiple response tests, used to measure judgment in certain situations, e.g., selecting a reasonable answer to a given example or problem. Items of information may also be checked by this type of test.

**Use of teacher-made tests.** At the beginning of each year the teacher will wish to learn all that is possible about the knowledge, skills, and judgment gained by the children in the work of previous grades and from their out-of-school experiences.

During the year, as the teacher plans for a unit, she will wish to give a pretest from which she may discover children's interests and information pertinent to the anticipated activity.

As a new concept or process is being approached, it may be well to give a pretest planned to cover the component process steps, facts, or meanings which constitute readiness for the new. For example, the introduction of systematic teaching of common fractions in Grade 5 will be preceded by a pretest to determine what fraction meanings have been learned by the children in earlier grades. Success in division with two-place divisors depends upon knowledge of the meanings of division, mastery of division facts, of multiplication with carrying (which in turn calls for decade addition facts), and of subtraction with borrowing. The pretest will usually

include some of the initial phases of the new work which may have been learned incidentally by a few of the children.

A constant check must be made on all facts and process steps in which mastery is the aim. Numerous forms of well-planned process step tests, diagnostic in nature, as well as inventory tests, should be available for the teacher's use that she may teach, test, reteach, and retest. Many short tests are more satisfactory than fewer long ones and serve to lessen nervous strain.

**Standardized tests.** The unfortunate long-term effect upon the children of tests administered primarily to produce marks or for the purpose of comparing grades and schools within a system is to be deplored. The test becomes the course of study and in the mind of the teacher becomes the yardstick by which her efficiency is measured. The children who are "got ready" periodically for the dreaded tests frequently spend valuable time on materials included in the test but not in the course of study.

The practice of using annual revisions of tests for each grade made by a committee of teachers and based on their own course of study, is to be encouraged.

**Observation.** Skill in measuring, estimating, telling time, and reading time expressions are more effectively checked through observation than through formal testing.

The written process step test, while it is the easiest to administer, is open to the criticism that a correct response may not represent desirable work habits. For example, the child who, in dividing 1345 by 36, makes a series of multiplication examples on scrap paper, may arrive at the correct quotient without having his weakness in mental multiplication discovered. Watching a child work and having him talk as he works will frequently do wonders to clear up difficulties or to disclose inefficient work habits.

**Interview.** Perhaps "individual test" may be a more familiar term than "interview" for the procedure of sitting down with a child and asking questions or giving directions to be followed.

**Recording evaluation results.** Teachers who wish to experiment with some form of evaluation chart will need to list specifically the understandings, skills, judgments, and work habits whose growth they plan to measure or to observe. If the teacher selects for study a limited number of items and enlists the complete co-operation of the children, she will gradually come to know the needs of the individuals in her class. The teacher's evaluation charts can become the basis for report cards.

Since child growth is a matter of concern not only to the teacher but to the child and to his parents, it seems desirable that reports should contain records of such growth. In place of the customary grading by an A, B, C, D, scale we might well substitute an evaluation in terms of growth in general mathematical fields. Suggestions for such a report follow; any appropriate phrases may be used.

### **Attitude Toward Arithmetic.**

A single word such as fearful, indifferent, enthusiastic, confident, overconfident, might be used by the teacher.

### **Comprehension.**

(1) Has a rich (meagre) background of concrete number experiences which enables him to understand readily (poorly) number situations, (2) makes transfer from concrete to symbolic materials easily (with difficulty), (3) grasps a new process or situation immediately (slowly).

### **Readiness.**

For a new process step or for the work of a grade. (1) Has (has not) profited from experiences, (2) has (has not) mastered prerequisite facts and skills, (3) has (has not) necessary maturity for anticipated work.

**Fact Skills**

(1) Concentrates easily (with difficulty) during a drill period, (2) is capable (incapable) of independent study, (3) resorts to counting or roundabout procedures when uncertain of responses, (4) needs more time for study of facts than can be allowed in school, (5) gives correct responses to facts as facts but applies facts poorly when distracted by complexity of an example.

**Process Steps.**

(1) Concentrates easily (with difficulty) on examples, (2) memorizes readily (slowly) the procedures in examples, (3) is seldom (easily) confused in following through the procedure in examples, (4) is not (is) prone to fact errors in examples.

**Judgment.**

(1) Shows good (poor) sense in money situations, (2) estimates distance, time, weight, etc., with exceptional (reasonable, limited) exactness, (3) evidences clear (muddled) thinking when meeting real situations in school, (4) in solving verbal problems, reads, analyzes, sees relationships, etc., well (poorly).

**Work Habits.**

(1) Checks computation habitually (under compulsion), (2) checks reasonableness of results skillfully (inefficiently), (3) takes pride in (avoids) computation by inspection, i.e., without pencil and paper, (4) assumes with enthusiasm (unwillingness) responsibility for accuracy, (5) works without (with limited, frequent) use of crutches.

**Need for Help at Home.**

If a teacher thinks a child needs help at home, because of absence, or for some other reason, she should provide specific directions for such help. An initial report of the type suggested above may be followed by a check-up on areas in which growth has taken place.

**OVERVIEW.****CHART: GRADES 1-6.**

## AREAS OF GROWTH.

WHOLESOME ATTITUDE TOWARD ARITHMETIC	JUDGMENT	WORK HABITS
	<p>Development of judgment in interpreting mathematical references in non-mathematical content.</p> <p>Development of judgment in aspects of measurement.</p> <p>Development of judgment in solving verbal problems.</p> <p>Development of judgment in consumer education situations.</p>	<p>Ability to work independently and resourcefully.</p> <p>Ability to discover and remedy one's own weaknesses.</p> <p>Use of crutches limited to those really needing them.</p> <p>Computation by inspection (without pencil) for those capable.</p>

MAJOR FIELDS	GRADE I	GRADE II	GRADE III
NUMBER CONCEPT	<p>Provision through experience for Rational Counting. Enumeration, identification, and reproduction of numbers 1-10 and beyond as needed. Cardinal and ordinal concepts. Recognition and building of groups.</p>	<p>Through the continued counting and handling of objects in an experience program, adapted to the development of individual children, computational and arithmetical concepts will be extended to two-place numbers and beyond as needed.</p>	<p>Counting by 2's, 5's, and 10's to 100 as needed in games and in school situations. Systematic instruction in place value of tens, hundreds, and beyond if necessary.</p>
READING AND WRITING NUMBERS	<p>Based on real needs. Recognition of number symbols to 10 and beyond as needed in finding pages in books or in taking attendance. Understanding of numbers used. Correct figure formation. Writing useful numbers.</p>	<p>As needed. Those large numbers that are needed will be recognized, read, and written. Attention to figure formation continues. Roman Numerals I to XII in telling time.</p>	<p>Two- or three-place numbers, or beyond if necessary; e.g. sale of War Saving Stamps in building. Correct formation of figures for those children who need such instruction.</p>



---



---

**MATHEMATICAL UNDERSTANDING.**

Development of the discovery technique to be used in a new learning situation.

Recognition of arithmetic as an organized system of relationships.

**COMPUTATION SKILLS.**

Ability to take responsibility for accuracy through use of checking.

Reasonable speed.

---



---



---

**GRADE IV**

Continued development of an understanding of the nature of our number system in so far as is possible at this grade level. See Grade VI for concepts toward which to work through meaningful materials.

**GRADE V**

Same as Grade IV.

**GRADE VI**

Continued development toward the end that "positional" or place-value and "decimal" features of our number system may be understood in so far as is possible at this grade level. At least accurate, if immature and incomplete, concepts are possible.

Continued development as need arises in experience units using materials from geography, history, current events, etc., emphasizing omission of "and" in whole numbers. Use of telephone number. Style in reading automobile and telephone numbers. Roman numerals, if and when, arising in chapter headings. Correct formation of figures given attention if necessary.

Same as Grade IV.

Continued development to provide increased knowledge of our number system.

---



---

	Grade I (Continued)	Grade II (Continued)	Grade III (Continued)
ADDITION	Meaning will grow out of the counting and handling of objects in the experience program. Some primary facts will be learned in like manner.	Through continued objective treatment in experiences and games, the meaning of addition will grow. Primary facts with sums 10 or less will be learned through use. No formal drill except for that limited number of children who show readiness for abstract work.	Mastery of the 100 primary addition facts. Mastery of the 300 decade addition facts (to $39 + 9$ ) needed for column addition. United States money. Development of interest and skill in checking addition examples.
SUBTRACTION	Meaning will grow out of the counting and handling of objects in the experience program. Some primary facts will be learned through making change in real situations.	Through continued counting and handling of objects in the experience program, an introduction to the remainder, addition, and comparison meanings of subtraction may be made. Primary facts with minuends 1-10 will be learned through use. No formal drill.	Development of remainder, addition, and comparison meaning of subtraction. Mastery of the 100 primary subtraction facts. Mastery of the subtraction process steps. Continued growth in ability to make change. Development of interest and skill in checking subtraction examples.
MULTIPLICATION		Through continued counting and handling of objects in the experience program, the meaning of multiplication will develop. Primary facts with products 1-10 will be learned through use. No systematic instruction.	Incidentally if and as need arises in experience units. Through use of real money or other objects meaning of multiplication may be established. Results may be discovered by addition with multiplication noted as a short method.
DIVISION			Any incidental use arising in experience units may be solved by use of real money.

Grade IV (Continued)	Grade V (Continued)	Grade VI (Continued)
<p>The 175 decade addition facts needed for carrying in multiplication (95 of these have already been taught as a part of the 300 decade facts needed for column addition).</p> <p>Continued practice on facts and on process steps in order to maintain mastery.</p>	<p>Continued practice to maintain mastery.</p>	<p>Continued growth in addition skills.</p>
<p>Continued practice on facts and on process steps to maintain mastery.</p>	<p>Continued practice to maintain mastery.</p>	<p>Continued growth in subtraction skills.</p>
<p>Mastery of the 100 primary multiplication facts.</p> <p>Mastery of the multiplication process steps.</p> <p>Development of interest and skill in checking multiplication examples.</p>	<p>Continued practice to maintain mastery.</p>	<p>Continued practice to maintain mastery.</p>
<p>Mastery of the 90 primary even division facts.</p> <p>Development of skill in relating the 360 primary uneven division facts to the primary even division facts in determining quotient figure; e.g., in the fact <math>7/51</math> it is enough to know that since seven 7's are 49 the quotient figure is 7.</p> <p>Division by a one-place divisor using long division form.</p> <p>Development of interest and skill in checking division examples.</p>	<p>Teaching for mastery of division with a two-place or easy three-place divisor when trial quotient is true quotient.</p> <p>Interest and skill in checking computation.</p>	<p>Mastery of division with two-place divisor when trial quotient is not true quotient. Easy three-place divisors continued.</p>

	Grade I (Continued)	Grade II (Continued)	Grade III (Continued)
MEASURE- MENT	<p>Time: Acquaintance with appearance of clock face at such time as opening of school or lunch time. Calendar: month, day of month, day of week.</p> <p>Length: as needed in measuring child's height, distances for games.</p> <p>Weight: pounds in own weight.</p> <p>Liquid: As met in school and home experiences, probably pint and quart.</p> <p>No formal instruction.</p>	<p>Measuring continued as needed in experiences.</p> <p>Time telling: hour and half hour.</p> <p>Calendar: continued use.</p> <p>Dozen.</p>	<p>Measuring and weighing as needed in activities.</p> <p>Measures: inch, foot, pint, quart, pound, and others as needed.</p> <p>Time telling completed.</p> <p>Calendar: days in month.</p> <p>Development of interest in recognition of measuring units and knowledge of commodities for which used.</p>
COMMON FRACTIONS	<p>One-half, and possibly one-fourth may be learned as part of a whole or part of a group of objects.</p> <p>Meaning to precede use of symbol.</p>	<p>Continued use of fractions as part of a whole or as part of a group of objects as needed in experience units.</p> <p>No systematic instruction. Use symbols only after meaning has been established.</p>	<p>Continued development of fraction meanings through objective treatment as need arises in activities.</p> <p>No systematic instruction.</p>

Grade IV (Continued)	Grade V (Continued)	Grade VI (Continued)
<p>Recognition of measuring units and knowledge of commodities for which used; skill in using measuring equipment; skill in estimating... Knowledge of relation between units taught objectively. Work with such measures as liquid, linear, time, weight, temperature.</p>	<p>Recognition of measuring units and knowledge of commodities for which used; skill in estimating; knowledge of relation between units taught objectively. Work with such measures as time, liquid, dozen, weight, temperature.</p>	<p>Recognition of measuring units and knowledge of commodities for which used; skill in using measuring equipment; skill in estimating knowledge of relation between units taught objectively. By the end of this grade it is reasonable to expect that the following units will be known.            Linear measure: inch, foot, yard, mile.            Liquid measure: half pint, pint, quart, gallon.            Household measures: teaspoonful, tablespoonful, cupful.            Weight: ounce, pound, ton.            Time: all units.            Dry measure: if locally used.            Square measure: square inch, square foot, area of rectangle.</p>
<p>Continued development of fraction meanings through objective treatment as need arises in activities. No systematic instruction.</p>	<p>Continued development of fraction meanings. Introduction to common fraction manipulation. All manipulation limited to denominators 2, 3, 4, 8, 16. Addition of fractions and mixed numbers with like and related denominators. (Emphasis placed on objective thinking leading to an understanding which requires that only results be written). Subtraction of fractions and mixed numbers with like and with related denominators; the minuend fraction larger than the subtrahend fraction in mixed number subtraction... Multiplication of (1) fractions and integers and (2) mixed numbers and integers.</p>	<p>Continued development of fraction meanings. Continued practice on addition and subtraction of fractions and mixed numbers. Teaching subtraction of mixed numbers with subtrahend fraction the larger. Continued practice in multiplication of (1) fractions and integers, and (2) mixed numbers and integers. Optional: Addition of common fractions and of mixed numbers with denominators unrelated. Introduction of (1) fractions multiplied by fractions and by mixed numbers and (2) mixed numbers by mixed numbers. Introduction of division involving fractions, mixed numbers and integers.</p>

	Grade I (Continued)	Grade II (Continued)	Grade III (Continued)
UNITED STATES MONEY AND DECIMAL FRACTIONS	United States money. Recognition of coins: cent, nickel, dime, etc., as needed. Counting money resulting from experiences such as buying milk, War Savings Stamps, etc. Beginning of knowledge of what can be bought for cent, nickel, dime.	United States money. Continued growth in recognition of coins, in skill in counting money, in knowledge of value of coins. Making change from nickel, dime, quarter, at Christmas (or other) sale.	United States money. Continued growth in recognition of coins, in skill in counting money, and in making change. Growth in knowledge of value of money. Writing United States money with use of dollar sign and decimal point. Addition and subtraction of United States money.
PERCENTAGE			
GRAPHS			Progress card for weekly spelling or arithmetic results.
SUGGESTED ACTIVITIES AND EXPERIENCE UNITS	Every day activities. Attendance, morning lunch, room responsibilities, care of pets, first grade daily newspaper. Occasional activities. War Savings Stamps, Junior Red Cross collection, serving refreshments, Christmas (or other) sale. Units in other fields. Science: Circus; Pets; Weather; Body Care and Growth. Social Studies: The School; The Home; The Farm. Health: Health Habits. Physical Education: Games. Classroom Games: Lotto, track games, dominoes, bean bags, shuffleboard.	Every day and occasional activities may be same as for first grade but adapted to second grade level. Units in other fields. Science: Wind and wind toys; Picnic or Party. Health: Playing store; marketing; planting seeds and bulbs. Social Studies: Post Office. Physical Education: Games; Circus. Classroom games: As in Grade I; also ten-pins, marbles, and games of chance using spinners.	Every day activities as in Grades I and II adapted to grade level. Occasional activities as in Grades I and II. Units in other fields. Science: Toys that Move; Thermometer and Barometer; Garden; Fun and Work with Weight. Health: One Pair of Feet. Physical Education: Stunt Show. Social Studies: Clothing a Third Grade Boy or Girl. Games: As in Grades I and II but with more complex scoring.

Grade IV (Continued)	Grade V (Continued)	Grade VI (Continued)
<p>United States money. Continued growth as in Grade III. Addition and subtraction continued. Multiplication using dollars and cents in the multiplicand. Division with one-place divisors using dollars and cents in the dividend.</p>	<p>United States money. Continued growth in ability to handle money. Systematic work leading to judgment in wise spending can be started in this grade.</p>	<p>United States money. Continued growth in ability to handle money and in judgment with regard to spending. Introduction to decimal fractions. Meaning of a decimal fraction. Reading and writing of decimal fractions. Addition, subtraction, multiplication, and division of decimal fractions and of numbers containing decimal fractions.</p>
		<p>Finding a percent of a number as needed in finding interest or in computing discount.</p>
<p>Interpretation of bar and picture graphs. Making broken line graphs prepared by teacher. Data for graphs to grow from classroom activities.</p>	<p>Interpretation of line, bar, and picture graphs. Construction of line graphs.</p>	<p>Continued interpretation of graphs: picture, line, bar, and circle. Construction of line and bar graphs.</p>
<p>There will be illustrative units in the outline now in preparation for this grade.</p>	<p>See Grade IV.</p>	<p>See Grade IV.</p>

## **THE EXPERIENCE PROGRAM.**

### **THE IMPORTANCE OF THE CHILD EXPERIENCE PROGRAM.**

The traditional program of the elementary school has often been designated as "isolated islands of subject matter learned from books". Arithmetic, long hesitant to give up its insular position, shows signs of yielding to reasonable and appropriate correlation or integration. Teachers are capitalizing children's experiences. The child experience program is important as a means of (1) making the school a community in itself and an integral part of the larger community, (2) integrating or correlating arithmetic with other phases of the curriculum, (3) developing mathematical understandings, (4) developing mathematical skills, (5) supplementing textbook problem solving and (6) establishing a background for consumer education viewpoint.

#### **Making the School a Community in Itself and an Integral Part of the Larger Community.**

In the modern school children assume responsibility for helping to plan the daily program; for accepting leadership at times and for becoming followers when desirable; for abiding by majority decisions and paying the price for poor judgment; for care and improvement of school property. Co-operation is a characteristic of the modern school. Competition has its place in games and sports, but competition between groups as a means of motivating subject matter has given way to competition with one's own previous record.

Interest in the welfare of others is evident in schools where children share through Junior Red Cross, treasure-chest book gifts, and other contributions for children overseas.

#### **Integrating or Correlating Arithmetic with Other Phases of the Curriculum.**

No one will deny that there must be a program of planned instruction which shall include meaningful presentation of facts and process steps, wisely administered drill, and effective testing. Only through such a program can the necessary mathematical skills be developed. However, we must not pass over lightly the enormous gains from the correlating or integrating of arithmetic with other subject matter in the curriculum. The arithmetic outcomes from units in history, science, physical education, and social studies will be suggested on later pages. A glance at these will convince one of the enrichment of the arithmetic program through the experiences of children. An awareness of the usefulness of arithmetic, a factor in creating a wholesome attitude, is an outcome of the experience program. Frequently the development of an activity gives rise to the need for an arithmetic skill, thus serving as motivation for drill. Again, facts and processes recently taught may find application in these experiences. Through activities the children come to see that not all arithmetic requires computation and thus become acquainted with informational arithmetic.

#### **Developing Mathematical Understandings.**

An examination of the sections devoted to arithmetic and other subject matter units impresses one with the many situations calling for addition, subtraction, multiplication, and division which should give depth and breadth to the meanings of these processes. The need for fraction concepts, the reading and understanding of common and decimal fraction expressions, and the performing of processes with these numbers often occur in activities. Percentage, in which real understanding is of major importance, arises in numerous ways in activities of current interest. Measurement, in a useful setting, is especially dependent on children's activities. Recognition of measuring units, and discovery of relations between units before memorization, require first hand acquaintance with measuring equipment.

#### **Developing Mathematical Skills.**

The necessity for planned instruction for the memorization of facts and process steps has already been indicated. However, we often neglect the effect of understanding on ease in



memorizing. We try too often to teach through drill alone that which can be learned in less time through use; e.g., relation between measuring units.

### **Supplementing Textbook Problem Solving.**

The solving of textbook problems constitutes but one phase of problem solving. Success in this field depends largely upon ability to read with comprehension. Many persons who cannot solve textbook problems have learned through use to meet their own general arithmetic situations quite successfully. Conversely many persons who solve textbook problems with great ease use little judgment in their own buying, savings, etc.

Problems growing out of children's activities have these advantages:

- a. Prices are real and current.
- b. The situation is real, and need not be imagined from a verbal description.
- c. The answers are important because they are to be used.
- d. Problems are timely.
- e. Judgment is required in assembling the data upon which real problems are based.

### **A Background for Consumer Education.**

There has been a growing interest in the consumer education viewpoint on the elementary level. The child experience program will include Saving, Spending, and Sharing activities.

## **CONSUMER EDUCATION IN GRADES 4 THROUGH 6.**

### **Meaning, Scope, and Objectives of Consumer Education.**

Some quotations may serve to remind us of the scope of consumer education in general. From "Education and Economic Well-Being in American Democracy"<sup>1</sup> we note: "Consumer education should seek to develop high standards of value and taste; aim at wiser expenditures for food, clothing, shelter, health, and recreation; develop better understanding of the significance of public expenditures and of individual savings; give some technical information to aid in selecting the best grade or brand of a particular commodity; and stress the social responsibilities of the consumer."

Harap and Mendenhall<sup>2</sup> think it important to make the consumer (1) "a better manager, who uses his income, savings, and other possessions to yield the greatest possible satisfaction; (2) a better buyer, who gets the best goods and services available; (3) a better user, who gets maximum utility from what he has and (4) a better consumer-citizen, advancing the welfare of consumers as a whole."

### **Saving, Spending, Sharing; The Program of Consumer Education in the Elementary School.**

Thrift Education in the public schools is nothing new. But the broader viewpoint of consumer or economic education which embraces spending and sharing as well as saving is receiving greater emphasis than heretofore.

The most successful programs of consumer education are being carried on where there is closest co-operation between home and school. In one school the transfer from war-time to peace-time savings was effected without serious lag in deposits through using results of a survey conducted to discover the desires of the families with respect to the continuance of the saving program.

Home-school associations can be of great assistance in providing speakers to discuss children's allowances, a matter of utmost concern and importance. The "touch" system costs the family far more and provides less training than does the allowance. The child's future economic efficiency will be affected by his early attitudes and training which will result from a

1. Education Policies Commission, "Education and Economic Well-Being in American Democracy."

2. Harap, Henry and Mendenhall, James E. "New Aims and Procedures in Consumer Education" 44th Yearbook of the National Society for the Study of Education p. 167-187.

"doing" and not just a "reading" program. Therefore, every opportunity for making real decisions and for participation must be utilized.

A comprehensive program of Spending, Sharing, and Saving results from integration of subject matter fields. For the beginning teacher, arithmetic may be the easiest subject field in which to launch a program of consumer education. However, she will soon find that the resources of every subject matter area are called into use in solving real problems.

Savings programs are being conducted in some communities through the purchase of stamps. In other localities the banks are providing banking service for the elementary school. No doubt teachers using the saving stamp plan are in touch with Mr. Carl T. Banks, Director of Education, Treasury Department, 79 Milk Street, Boston, who is ready to give personal guidance and to provide materials to assist in the furtherance of the saving program.

Miss Evelyn Lindquist, in her report on "The Children's Bank", "Making a Bank Booth", and "Selling United States War Stamps", has provided excellent suggestions for a "live" savings program. These reports may be obtained from the Arithmetic Materials Bureau, State Teachers College, Salem, Massachusetts, Mildred B. Stone, Chairman.

It is to be hoped that the days are over when intense competition encourages teachers to "lend" pennies to children in order to get the banner for 100% participation for the grade. The child whose chief motive is competition will not be likely to continue his saving in high school where that motive has been removed. Encouraging children, especially in lower grades, to save "for something" instead of "just saving" may provide reasonable motivation and lead to desirable habits.

More and more teachers who are developing effective savings programs are working for (1) increased child participation and responsibility for saving and for handling class savings, (2) growth in the mechanics of change making, counting and rolling money, keeping records, etc., and (3) better use of time in handling the savings program.

Wise Spending is necessary if Saving and Sharing are to be made possible. Spending includes (1) choice of goods and services for which money is to be spent: e.g., candy or a toy; (2) selection of articles to be purchased; e.g., which toy or which candy bar; (3) conservation of goods and services.

At the outset the teacher will do well to make a survey of the money-handling experiences of the children in her grade. Included should be the activities growing out of the spending of their allowances or gifts and the money which they earn. They also spend money earned or collected by the class (or by the school). Indirectly a portion of the family and of the community money is spent for children.

A few suggestions for ways of approaching the problem of wise spending and conservation follow:

1. Let the children tell orally or in writing what each would do if \$10.00 were given to him. Follow this with oral or written discussion about the use of an earned \$10.00.

2. Make a study of advertising addressed to the child through magazines and radio programs. Bring in the products and examine them.

3. Make a study of any one of the budget items. Pertinent food problems today include (1) comparative costs of frozen and fresh products, of bakery and homemade goods, of "mixes" and home mixed ingredients, of canned and fresh vegetables, of chain store and corner grocery purchases, etc., (2) quantity buying and subsequent storage.

4. Form a "Shoppers Club". Study best buys in specific foods being purchased in homes: e.g., fruit, fruit juice, canned fruit, or vegetables.

5. Let children experiment with cloth shrinkage; spot removal; making soap, hand lotion and candy.

6. Plan excursions for shopping, to see egg grading, etc.

7. Let children collect candy bars or wrappers and examine for weight.<sup>1</sup> A recent survey resulted in the discovery of five cent bars of these weights:  $\frac{7}{8}$  oz., 1 oz.,  $1\frac{1}{4}$  oz.,  $1\frac{5}{8}$  oz.,  $1\frac{1}{2}$  oz.,  $1\frac{3}{4}$  oz., and 2 oz.<sup>1</sup> One may prefer the bar weighing  $\frac{7}{8}$  ounces but should know the weights of other bars.

8. Plan displays; e.g., a clothing style show.

9. Let children make cartoons showing buying situations.<sup>2</sup>

10. Let children set up a Travel Bureau providing information for teachers, parents, etc.

11. Let children make all arrangements for a picnic and invite teachers to attend.

12. Children may plan and build a store in which to sell articles desired by adults and by other children, proceeds being used to purchase something for the school room. One class<sup>3</sup> sold orange jelly, a superior brand of coffee, and a special kind of broom to their parents.

13. Costs of a specified trip by car, train, bus and airplane may be compared.

14. In late winter each child may draw a plan for the garden plot that he hopes to have in his own backyard. This plan should be very definite inasmuch as a fixed space should be allotted to each type of plant.

15. Plans should be made for selling the flowers or vegetables produced in #14. All expenditures and receipts should be recorded.

16. In one school, a co-operative shoe-shine venture has resulted in greater interest in care of shoes.

Many opportunities arise for Sharing which can be made a part of the classroom consumer education program. Among them are sharing with other children or other classes in the school; gift for an ill classmate; party for kindergarten or children from another grade; sharing with home members; gifts, and school parties for mothers.

Sharing with others in the immediate community may include gifts for children's hospitals or wards, favors for hospitals, giving to community fund.

Sharing with others in the larger community may include gifts for veterans' hospitals, Junior Red Cross activities, gifts through other organizations for overseas use.

## BIBLIOGRAPHY.

### A. Books and Pamphlets.

Brindze, Ruth. JOHNNY GET YOUR MONEY'S WORTH. Vanguard, 1938. \$2.00

Heimers, Lili and Cook, Margaret G. "Consumer Education for All Ages." New Jersey State Teachers College, Audio-Visual and Teaching Aids Service, 1945. 50¢.

National Council of Teachers of Mathematics. "The Role of Mathematics in Consumer Education". Consumer Education Study of the National Council of Teachers of Mathematics, 1201 Sixteenth Street, N.W., Washington 6, D. C.

National Association of Secondary-School Principals. "Consumer Education in Your School". Consumer Education Study, National Association of Secondary-School Principals, 1201 Sixteenth St., N.W., Washington 6, D. C.

Superintendent of Documents, U. S. Govt. Printing Office, Washington, D. C. "Guiding Family Spending". U.S.D.A. Misc. Pub. No. 661, 15¢  
"Materials for Consumer Education" US.D.A. Consumers' Council Division, Consumer Counsel Series Pub. #10, 10¢

1. Brindze, Ruth, "Johnny Get Your Money's Worth", Vanguard 1938.

2. Childhood Education 17: 365-368, April 1941—"The Adventures of Johnny Consumer".

3. Heald, Flora, Supervisor of Grade 6, Training School State Teachers College, Westfield, Massachusetts.

University of Massachusetts, Amherst, Mass., Extension Service.  
 "Business Facts for Busy Homemakers". Leaflet No. 239.  
 "Teaching Children About Money". Leaflet No. 195.

### B. Periodicals.

- EDUCATION FOR VICTORY. "Consumer Education—A 'Must' for Elementary Schools". 2: 4-6, August 16, 1943.
- Gavian, Ruth W. "Children's Experiences With Money". SOCIAL EDUCATION 2: 166-169, March, 1938.
- Gavian, Ruth W. "Economic Education on the Elementary Level". NATIONAL COUNCIL FOR SOCIAL STUDIES, Eleventh Yearbook, 1940. 1201 Sixteenth St., N.W., Washington, D. C.
- Gavian, Ruth W. "Education for Economic Competence in Grades I to VI." Teachers College Contributions to Education #854, Bureau of Publications, Teachers College, Columbia, New York, N. Y.
- Harap, Henry and Mendenhall, James E. "New Aims and Procedures in Consumer Education". Forty-Fourth Yearbook of the National Society for the Study of Education, American Education in the Postwar Period; Part I. Curriculum Reconstruction, p. 167-87.
- Lindquist, Evelyn R. "Taking Care of School Supplies". EDUCATION 65: 475-77, April, 1945.
- National Elementary Principal 27: 2-33, February, 1948. "Consumer Education in the Elementary School".
- Winsor, Charlotte B. "Schools Can Teach the Use of Money". Child Study 23: 42-43 Winter 1945-46.

## INTERRELATIONS OF ARITHMETIC AND OTHER SUBJECTS.

### Arithmetic and Reading.

The elementary school program is based on reading. All subjects at one time or another are taught through reading. The teachers of the intermediate grades are responsible for developing learning situations in which social studies, arithmetic, science, and the language arts are involved. Within these areas there is much material to be read in which quantitative ideas are presented and must be understood by teacher and learners. To ignore these items is to tear great gaps in the understandings which must be developed if the teaching is to be successful.

It is evident that most children and most adults tend to avoid considering items that refer to number in any form. This avoidance, of course, makes it impossible to have a vivid concept of the material read, and few "brass tacks" are available to pin down factual information.

Children in one fourth grade were asked by their supervisor to "bring me a few books from the cupboard". Many persons think erroneously that we all interpret in the same way such terms as few, some, many, long ago, future. This supervisor found that the children's ideas of **few** varied from 2 to 11. Further questioning revealed the following: **some** ranged from 3 to 35; **many** from 5 to 34; **long ago** from 2 to 90,000 years; **future** from 1 to 100 years.

Some discussion of these commonly accepted terms will help children to find a range of definite values within which the indefinite reference might reasonably fall. Children may then be encouraged to consult other sources in an attempt either to verify or to limit more closely the range already assumed, thus going from opinion and judgment to research.

The clarification of word concepts necessitates building meanings for the many quantitative items that appear in subject matter. The term "dense population" is common. What does

it mean to a child? A college graduate on his first visit to New England was amazed to ride through a section of Massachusetts where great stretches of fields and woods were unmarked by buildings of any kind. He exclaimed, "But I've always been taught that this state was densely populated. I had a picture in my mind of a place completely covered with dwelling houses, with not even a large garden in sight. But you have plenty of room, so what did the geography mean when it said over and over again that you have a dense population?" What measuring stick could his teachers have used so that he might have had a more nearly accurate picture in his mind?

Developing concepts of size, distance, and other quantitative items which occur in the reading material presented to children in the middle grades requires definite direction on the part of the teacher. This may well take the form of devising some sort of familiar measuring stick to which these items may be compared. Reading these items without interpreting them into one's own experience creates confusion and incorrect ideas.

Authors and editors of many of the newer texts are conscious of the need for using a measuring stick to clarify ideas. This is a quotation from a fifth grade geography text: "When you come down from the high mountains, you do not come to lowlands. All of the large area colored dark brown on the map on pages 8-9 is 5000 feet or more above sea level. That is a distance of nearly a mile. The lowest parts of the areas shown in brown are nearly a mile above sea level. The highest parts are almost two miles above sea level. This is very high land. Do you know a place which is just a mile from your school or your home? If not, you might ask someone to measure a mile with the speedometer of an automobile. You will understand better just how long a mile is if you walk the distance after it has been measured. Now imagine you can pick up the mile of road and stand it on end. The top of it would be about as high above as the lower parts of the area colored brown on the map are above sea level."<sup>1</sup>

Some suggestions for building readiness to read quantitative ideas are as follows:

#### **Firsthand Experience Leading to Visualization.**

1. Making a collection of measuring equipment, container, etc.
2. Establishing "yardsticks" with which to make comparisons mentally when reading.
  - a. Based on personal measurements: parts of the body, length of a pace, average height of boys and of girls in grade, height of teacher, of principal, of janitor.
  - b. Based on measurements made at home: size of rooms, heights of doors and ceilings, length of lot.
  - c. Based on measurements made at school: size of rooms, longest straight distance from homeroom to auditorium, etc., length and width of playground, distance to nearby store or to center of city.
  - d. Based on distances within state: distance to city boundaries, to centers of surrounding towns and cities, to state boundaries in different directions in terms of mileage and in time of travel by bus, rail, automobile, or plane.
  - e. Height of own town above sea level: compare with heights of other places known to children.
  - f. Area and population made real if possible: lay off acre on playground or in vicinity, find areas of playground, block in which city is located, nearby parks, etc. Population of own city and surrounding towns and cities can be looked up and discussed.
  - g. Ideas of multitude can be gained from studying room capacity, seating capacity of the school auditorium, armory, athletic field, the moving picture theatres, high school auditorium. Many children will have been to Boston Garden. The sizes of the various "bowls" are known to most children by sight as seen in the movies.

1. McConnell, W. R. *Geography of the Americas*, Chicago, Rand McNally and Company, 1947, p. 29.

### Mathematical Outcomes from Units in Other Subject Matter Fields.

Space does not allow listing in detail the mathematical outcomes from every unit. We have, therefore, selected a limited number of science units, and noted a few of the outstanding outcomes.

#### Grade 4.

Topic: Animals — Big and Small. Compare sizes of animals; make scale showing heights or lengths.

Topic: Bird Feeding Station. Compare cost of home-made and commercial; read simple plans; plan material needed to make feeding station, pricing materials at several shops, searching at home for suitable materials; compare cost of food bought in bulk vs. small quantity; compute savings in preparing food when possible.

Topic: Weather. Read thermometer and compare degrees of change during day or shorter period.

Topic: Trees and Shrubs. Ask 8th grade to find by use of shadow measurement the heights of some trees in the school yard, and then let these trees serve as yardsticks in estimating heights of others.

Topic: Birds. Estimate lengths of birds as one means of identification.

#### Grade 5

Unit II. Spore Bearers. Measure or estimate in making map.

Unit IV. Animal Pets. Find cost of feeding pet; make time table for care of animal; find cost of veterinary service.

Unit VI. House Plants. Mark calendar at beginning and end of experiment and find time; measure plant food, water, etc.

Soil. Compare weights of different types of soil.

Garden. Read directions for planting seeds and estimate depth and distance apart; consider height to which plant will grow when planning a garden.

Landscaping an Ugly Spot. Find area of spot to help in buying fertilizer, grass seed, etc

Unit VII. Trees. Measure or estimate in making map.

City Planting. Measure an acre on school yard or elsewhere to use as yardstick when studying town forests.

Unit IX. Rocks and Minerals. Compare weights of like-sized specimens of rocks and minerals.

Unit X. Water and Rainfall. Understand average; read numbers relating to average rainfall.

#### Grade 6.

Unit III. Landscaping School Ground. Find area to aid in buying fertilizer, grass seed; find volume of loam needed.

Unit IV. Bees. Find cost of keeping bees; find cost of honey.

Clothes Moths. Find cost of moth protection for the home; find cost of repairing moth-eaten clothes; find cost of storing clothes.

Unit VIII. Visiting a Wild-Life Sanctuary. Compute cost of transportation; plan lunch.

Unit XI. Airplanes. Compare cost of travel by bus, train, automobile, plane; compare costs of air mail and air express with surface transportation costs; make a model airport; plan baggage to keep within limit.

### ARITHMETIC ACTIVITIES.

Space does not permit the inclusion of a complete unit.

Reports of activities carried out by teachers in the state have been duplicated for distribution by the Arithmetic Materials Bureau, State Teachers College, Salem, Massachusetts, Mildred B. Stone, Chairman.

Summaries of these reports follow.

**The Cost of Raising 250 Chickens.**

**Grade 6.**

Carol Coulter  
Brookville

Miss Coulter shows us how a small poultry business in the community became the basis of an interesting arithmetic activity furnishing real problems of many types and contributing to consumer education understanding.

**Daily Cookie Sales.**

**Grade 6.**

Adele Driscoll  
Training School  
State Teachers College, Salem

This activity shows the outcomes in arithmetic and other subject-matter fields when children took over a routine school experience.

**Arithmetic in the 1940 Census.**

**Grade 6.**

Evelyn Keyes  
Springfield

While this activity may seem out of date, we have retained it as an excellent illustration of the way teachers may correlate classroom work with current happenings.

**The Children's Bank.**

**Grade 6.**

Evelyn Lindquist  
Training School  
State Teachers College, Bridgewater

Taking care of school savings, so often just one more responsibility for the teacher, became a vital group activity. Some outcomes were motivation for saving, acquaintance with local bank, and familiarity with necessary bank forms which are illustrated in this report.

**Earning Money for a Moving Picture of Ourselves.**

**Grade 6**

Evelyn Lindquist  
Bridgewater

This activity involves taking moving pictures, using film purchased through the proceeds from a puppet show and from the sale of decorated boxes, memo pads, shuffleboard sets and handkerchief holders made by the children.

**An Ice Cream Sale.**

**Grade 6.**

Evelyn Lindquist  
Bridgewater

This activity effectively illustrates civic responsibility in helping less fortunate children, efficiency in planning a sale, and group co-operation in carrying out the plan.

**Planning and Building a Bank Booth.**

**Grade 6.**

Evelyn Lindquist  
Bridgewater

In the words of the author, "This problem provided another opportunity for the class to share responsibility in an interesting experience which called for judgment and which gave a practical use for denominate numbers."

**Taking Stock of What We Have in Our Room.**

**Grade 6.**

Evelyn Lindquist  
Bridgewater

Miss Lindquist found that the principal outcomes of this activity were greater care of books and equipment, and real appreciation for the value of things hitherto taken for granted."

**Automobile Road Map.**

**Grade 6.**

Edith Moser  
Salem

This shows how even an automobile road map can increase interest in and acquaintance with one's own country.

**The Cost of My Education.**

Mary Mullen

**Grade 6.**

Leominster

Miss Mullen lists outcomes in arithmetic and other subject-matter fields and makes this interesting comment. "The unit seemed to have built up a pride in the knowledge that our system was economical and efficient, and a scorn for unnecessary waste."

**Byrd's Snow Cruiser Goes Through Springfield.**

Gladys Potter

**Grade 6.**

Springfield

This activity is retained and summarized in the hope of encouraging teachers to become aware of and to use local happenings which are interesting and timely.

**Paper Salvage.**

Grace Rowland

**Grade 6.**

Bridgewater

Miss Rowland describes the procedure in handling the paper sales, and lists not only the arithmetic outcomes but the social values derived from working together.

**A Harvest Sale.**

Virginia Salaba, Student

**Grade 6.**

State Teachers College, Westfield

The acquisition of information and skills, and the group work resulting from this very practical means of disposing of surplus garden produce, are well described.

**Fun and Business Selling Seeds.**

Catherine Towey

**Grade 6.**

Bridgewater

This activity reports the development not only of the arithmetic needed in a business venture but of the salesmanship. Creative ability is shown in the assembly planned for advertising purposes.

**Taking Charge of the School Supplies.**

Louise Borchers

**Grade 5.**

Training School

State Teachers College, Bridgewater

From this activity children gained valuable arithmetic outcomes, experience in rendering services, and a real appreciation of the need for conserving school supplies.

**School Library.**

Helen Burke

**Grade 5.**

Beverly

This activity reports a pre-test, the pre-planning, the diary of day by day work, the evaluation, and work samples. The practicality of the problem and the detail with which it is reported, make it recommended reading for the teacher of any grade.

**Serving Refreshments.**

Mary Mahar

**Grade 5.**

Training School

State Teachers College, Westfield

The educational objectives and outcomes, related to the serving of refreshments to a group of visiting teachers, are ably set forth in this report.

**Selling Cookies.**

Priscilla Peabody

**Grade 5.**

Beverly

This activity reports the way in which fifth grade children handled the selling of cookies throughout their building. The detail with which it is worked out will be of help to teachers who are interested in doing the same type of thing.

**A Candy Sale.**

Mary V. Perham

**Grade 5.**

Training School

State Teachers College, Salem

This teacher showed ingenuity in leading children to find recipes for uncooked candy



and those requiring only melting of ingredients instead of boiling. Although a kitchen was available in the school, Miss Perham used an electric plate in her classroom as most teachers would do.

**A School Garden.**

Mary V. Perham

**Grade 5.**

Salem

This activity was outstanding in the practical use of denominate numbers and the making of scale drawings. A real interest in gardening was aroused.

**Arithmetic Fair.**

Ruth K. Simons

**Grade 5.**

Beverly

This report shows how the culminating activity of the summarized measurement project was shared with parents and community. Those attending this Fair went away with greatly increased interest in the teacher and the work she was doing.

**Measurement.**

Ruth K. Simons

**Grade 5.**

Beverly

An enormous number of varied and interesting measuring experiences were planned and carried out by the children. A greater acquaintance with the local area resulted.

**Collection and Sale of Waste Paper.**

Doris Cambridge

**Grade 4.**

Training School

State Teachers College, Salem

Miss Cambridge has outlined in detail the arithmetic skills, judgments, and appreciations resulting from the unit. Two results of this activity are particularly interesting: (1) the writing of compositions depicting the stories some of these old newspapers might tell if only they could talk and (2) the preparing and staging of a three-act play based on the story of waste paper.

**Fourth National Store.**

Lena Carter

**Grade 4.**

Weston

In the years since this activity was originally reported, the trend in classroom stores is toward the selling of real materials and the use of real money. In a community not ready for the above, this imaginary store may be helpful.

**A Candy Sale.**

Pauline M. Mende

**Grade 4.**

Ware

This report indicates the computation arising in a candy sale, proceeds of which were used to purchase pictures for the classroom.

**Daddy's Carfare.**

Theresa Nasella

**Grade 4.**

Revere

This activity reports a study of one of the home budget items resulting in a broadened consumer education viewpoint. Other budget items might equally well be studied in the classroom.

**Cost of Summer Camp.**

Elizabeth Quattlander

**Grade 4.**

Training School

State Teachers College, Fitchburg

This is a timely report, both interesting and informative, based on preparation for summer camp.

UNITS WHICH MAY BE OBTAINED FROM THE  
MATERIALS BUREAU, STATE TEACHERS COLLEGE AT SALEM

Mildred B. Stone, Chairman

List Revised January, 1950

Number	Grade	Author	Title	Cost
1	6	Coulter	Cost of Raising 250 Chickens	.03
2	6	Driscoll	Daily Cookie Sales	.01
3	6	Keyes	Arithmetic in the 1940 Census	.01
4	6	Lindquist	Children's Bank	.05
5	6	Lindquist	Earning Money for a Moving Picture of Ourselves	.04
6	6	Lindquist	Ice Cream Sale	.03
7	6	Lindquist	Building a Bank Booth	.03
8	6	Lindquist	Selling U. S. War Saving Stamps	.01
9	6	Lindquist	Taking Stock of What We Have in our Room	.03
10	6	Moser	Automobile Road Map	.01
11	6	Mullen	Cost of My Education	.02
12	6	Potter	Byrd's Snow Cruiser Goes Through Springfield	.01
13	6	Rowland	Paper Salvage	.02
14	6	Salaba	Harvest Sale	.03
15	6	Towey	Fun and Business Selling Seeds	.06
16	5	Borchers	Taking Charge of the General Supplies of the School	.03
17	5	Burke	School Library	.13
18	5	Mahar	Serving Refreshments	
19	5	Peabody	Selling Cookies	.06
20	5	Perham	Candy Sale	.02
21	5	Perham	School Garden	.01
22	5 & 6	Simons	Measurement	.08
23	5 & 6	Simons	Arithmetic Fair	.02
24	4	Cambridge	Collection and Sale of Waste Paper	.03
25	4	Carter	Fourth National Store	.02
26	4	Mende	Candy Sale	.01
27	4	Nasella	Daddy's Carfare	.01
28	4	Quattlander	Cost of Summer Camp	.02

### ENRICHMENT PROCEDURES.

#### ENRICHMENT FOR THE CLASS AS A WHOLE.

Arithmetic, which for many years was confined to a fixed twenty or thirty minutes a day, has become an integral part of all subjects having quantitative ideas. Children who say "My mother could never do arithmetic and I can't either" will, through correlation with the geography or science, always so interesting to them, find themselves developing a liking for what has always seemed unbelievably dull. If these children find that the making of boat models is not frowned upon by the teacher of arithmetic but instead is considered worth-while mathematically, they gain in power as well as in interest. The sports-minded boy may find that his knowledge of baseball is an asset.

Use of arithmetic-centered activities suggested by children, particularly those based on buying and selling real things, may serve to increase interest and may often result in "Miss Smith, we aren't working fast enough; we need more practice in multiplication."

The children must have access to plenty of books and to materials of various sorts.

A fifty foot tape is invaluable, as are wooden or paper square inches and square feet, and inch cubes, also boxes into which these cubes may be fitted.

#### ENRICHMENT FOR THE RAPID LEARNING CHILD.

The rapid learning child may become in arithmetic teaching the "problem" child. He grasps ideas quickly and memorizes more easily than the average child. In years past the penalty for brightness has been sitting through tedious periods of explanation needed by other children, and doing fifteen examples instead of the ten assigned to the average child.

Two of the solutions tried for better use of the time of the rapid learner are acceleration in subject matter growth which may create a problem in later grades, and enrichment of the program while covering the maximum subject matter assigned to the grade.

#### SUGGESTIONS FOR ENRICHMENT MATERIALS INCLUDE:

1. Simple historical phases of number
  - a. Number symbols and systems of early civilizations
  - b. The abacus
  - c. Early methods for computing addition, subtraction, multiplication, and division
  - d. Origin and development of measuring units
  - e. Early computing devices
2. Construction
  - a. Games to be used in own or other grades
  - b. Bank booth and store counters
  - c. Scales
  - d. Early time telling devices: sundial, water clock, hour glass, fire devices.
  - e. Dioramas depicting early types of money.
3. Mathematical puzzles such as magic squares
4. Discovery of arithmetic usage and significance in everyday life
  - a. Play or skit depicting a world without mathematics
  - b. Information pertaining to current prices, sizes of children's clothing, etc.
  - c. Nature and relative frequency of uses of common and of decimal fractions
  - d. Measures used by Mother or other member of family
  - e. Mathematics of sports
5. Making moving pictures and/or film strips
  - a. Showing children using arithmetic in classroom
  - b. Showing arithmetic uses occurring in some unit

#### LIST OF AVAILABLE FILMS AND FILMSTRIPS FOR MATHEMATICS.

This list of Films and Filmstrips was compiled by Professor Henry Syer of Boston University for use by him and by Professor Robert Burch also of Boston University. It is with Professor Syer's generous permission that we are able to include this list.

##### Part 1—Sources.

- |    |  |
|----|--|
| Ae | Aetna Life Insurance Co., Hartford 15, Conn.               |
| Am | American Film Registry; 28 East Jackson St., Chicago, Ill. |
| Ar | Arizona University, Extension Division; Tucson, Ariz.      |
| Ba | Bald Eagle Film Productions; New Haven, Conn.              |
| Be | Bell and Howell; 1801 Larchmont Ave., Chicago, Ill.        |
| Br | Brandon Films, Inc.; 1600 Broadway, New York 19, N. Y.     |

Co	Co-operative League Film Dept.; 167 West 12th St., New York 11, N. Y.
Cr	Coronet Films, Inc.; Coronet Bldg., Chicago 1, Ill.
Cu	Curriculum Films; R.K.O. Bldg., Radio City, New York, N. Y.
En	Encyclopedia Britannica Films, Inc.; 20 No. Wacker Drive, Chicago 6, Ill.
Ge	General Electric Co.; River Rd., Schenectady, N. Y.
Gm	General Motors Corp.; Dept. of Public Relations, 1775 Broadway, New York, N. Y.
Gw	Georgia University, Division of General Extension; Old College, Athens, Ga.
Ho	Household Finance Corp.; 919 No. Michigan Ave., Chicago 11, Ill.
Il	Illinois University, Extension Division; Urbana, Ill.
In	Indiana University, Bureau of Audio Visual Aids; Bloomington, Ind.
Ja	Jam Handy Co.; 2900 East Grand Boulevard, Detroit 11, Mich.
Jo	Johnson Hunt Productions; 1133 No. Highland Ave., Hollywood 38, Cal.
Ka	Kansas University, Bureau of Visual Education; Lawrence, Kan.
Kn	Knowledge Builders Classroom Films; 625 Madison Ave., New York 22, N. Y.
Mo	Modern Talking Picture Service; 9 Rockefeller Plaza, New York 20, N. Y.
Na	National Film Board of Canada; 620 Fifth Ave., New York 20, N. Y.
Ph	Photo and Sound Productions; 116 Natoma St., San Francisco 5, Cal.
Po	Popular Science Publishing Co.; Audio Visual Inc., 353 Fourth Ave., New York, N. Y.
Re	Religious Films Assoc. Inc.; 297 Fourth Ave., New York, N. Y.
Ru	Rutherford R. Boyd; Leonia, N. J.
So	Society for Visual Education; 100 East Ohio St. Chicago, Ill.
Te	Teaching Films Custodians; 25 West 43rd St., New York 18, N. Y.
Un	United World Films; 445 Park Ave., New York 22, N. Y.
Vi	Visual Science; Suffern, N. Y.
Yo	Young America Films Inc.; 18 East 41st St., New York, N. Y.

**Part 2—Films. (Source is given at the left of each)**

Cr	Banks and Credit (16mm., sd.)
Te	Borrowing in Substraction
Cr	Consumer Protection (16 mm., sd.)
Jo	Decimal Fractions (11 min., 16 mm., sd., B & W and color)
Am	Earth—Latitude & Longitude, (1 reel, 16 mm., sd.)
Am	Face of the Earth (16 mm., sd.)
Cr	Federal Taxation (16 mm., sd.)
Cr	Fred Meets a Bank (1 reel, 16 mm., sd., B & W and Color)
Jo	How to Add Fractions (11 min., 16 mm., sd., B&W and Color)
Jo	How to Change Fractions (11 min., 16mm., sd., B & W and Color)
Jo	How to Divide Fractions (11 min., 16 mm., sd., B & W and Color)
Jo	How to Multiply Fractions (11 min., 16 mm., sd, B & W and Color)
Jo	How to Subtract Fractions (11 min., 16 mm., sd., B & W and Color)
Co	Installment Buying (16 mm., B & W and Color)
Jo	Introduction to Fractions (11 min., 16 mm., sd., B & W and Color)
Cr	The Language of Graphs (1 1/4 reels, 16 mm., sd., B & W and Color)
Cr	Let's Count (16 mm., sd.)
Cr	Maps Are Fun (1 reel)
Yo	The Meaning of Percentage (10 min., 16 mm., sd.)
Cr	Measurement (10 min., 16 mm., sd., B & W and Color)
In	Money to Loan (16 mm., sd.)
Re	Our Children's Money (16 mm., sil.)
*Yo	Parts of Nine (11 min., 16 mm., sd.)
Yo	Parts of Things (10 min., 16 mm., sd.)
Jo	Percentage (11 min., 16 mm., sd., B & W and color)
En	Property Taxation (16 mm., sd.)
Gu	Protecting the Customer (16 mm., sd.)
Kn	Ratio and Proportion (16 mm., sd.)
*Yo	The Teen Numbers (10 min., 16 mm., sd.)
Mo	Time—The Servant of Man (20 min., 16 mm.)

\*May be obtained from the Office of Radio-Audio Visual Aids, Department of Education, 200 Newbury Street, Boston 16.

- En Using the Bank (16 mm., sd., B & W and Color)  
 Un Visualizing an Object (9 min., 16 mm., sd.)  
 Cr We Discover Fractions (1 reel, sd., B & W and Color)  
 Yo What is Four (10 min., 16 mm., sd.)  
 Cr What is Money (10 min., 16 mm., sd., B & W and Color)  
 Cr Work of the Stock Exchange (1½ reel, 16 mm., sd., B & W and Color)

**Part 3—Filmstrips. (Source is given at the left of each)**

- Ja Addition and Subtraction (16 frames, \$4)  
 So Areas  
 Ja Arithmetic of Algebra (40 frames \$4)  
 So Banking as a Career (\$2)  
 Ph Changing Fractions to a Common Denominator, Part A (25 frames)  
 Ph Changing Fractions to a Common Denominator, Part B (25 frames)  
 Ph Comparing Fractions—Adding and Subtracting (25 frames)  
 Po Compound Subtractions (Color, \$5)  
 Ph Dividing Fractions (25 frames)  
 Ja Five Keys to Math (46 frames, \$4)  
 Ja Fractions, Decimals, & Percentage (55 frames, \$4)  
 Ja Graph Uses (45 frames, \$4)  
 Ph Improper Fractions—Mixed Numbers (25 frames)  
 So Introduction to Signed Numbers  
 So Measurement Instruments: Outside the Laboratory (\$2)  
 Ja Measurements & Measuring; Part 1 (50 frames, \$4.50)  
 Ja Measurements & Measuring; Part 2 (64 frames, \$4.50)  
 Ho Money Management (17 frames, \$2)  
 Ph Multiple Fractions—Improper Fractions (25 frames)  
 Ph Multiple Fractions—Numerator and Denominator (25 frames)  
 Ja Multiplication & Division (27 frames, \$4)  
 Ja Multiplication & Division of Fractions (21 frames, \$4)  
 Ph Multiplying Fractions (25 frames)  
 Po A Number Family in Addition (Color, \$5)  
 Ja Order of Operation (37 frames, \$4)  
 Ja Plotting Graphs (62 frames, \$4)  
 Ja Positive & Negative Numbers (48 frames, \$4)  
 Ja Problem Analysis (37 frames, \$4)  
 Ja Ratio & Proportion (40 frames, \$4)  
 Ph Reducing and Changing Fractions (25 frames)  
 Po The Threes (Color \$5)  
 Vi Timekeepers Through the Ages (41 frames)  
 Po The Twos in Division (Color, \$5)  
 Ph Units and Fractional Parts (25 frames)  
 En Using Numbers  
 Po What Numbers Mean (Color, \$5)  
 Po Zero—A Place Holder (Color, \$5)

**TEACHING OF DENOMINATE NUMBERS.**

Many of the suggestions for the teaching of Measurement apply equally well to Grades Four, Five, and Six. For that reason, this general discussion of Measurement is being included prior to the Grade Sections.

**MEASUREMENT.**

Measurement, so useful in the everyday life of the child in his home, community, and school, can be a most enjoyable topic to teach and to learn. No phase of arithmetic occurs with greater frequency in instructional units, as children read text and supplementary materials; make murals, charts, graphs, maps, posters or other two dimensional illustrations; set up models, dioramas, sand tables, or other three dimensional displays; build aquaria; plant

seeds or bulbs; care for a garden; sell milk, cookies or fruit juice, order and distribute supplies; plan assembly programs, parties, and other social activities; and in general carry on a living program within the school.

Teachers often ask what "tables" they should teach. The present tendency seems to be to include linear, surface, volume, liquid, weight, and time measures. Dry measure is little used by consumers in urban areas where peas, potatoes, spinach, etc. are retailed by weight. In rural areas, teachers may find that dry measure has a place. Anyone wishing to know state regulations may write to Department of Weights and Measures, State House, Boston, Massachusetts, for a card describing legal measures.

Money is not being included here as a phase of measurement because it has seemed that reading, writing, and computing dollars and cents are steps respectively in reading, writing, and computing whole numbers.

Any metric measure unit occurring in the child's reading can be discussed when the need arises. The child may be interested to know that a mixture of English and metric units may be found in the United States. Spectacle bridges are measured in millimeters, bows in inches. Large rectangular stones such as are found in class rings are measured in millimeters, as are stamps.

Knowledge and judgment often neglected in our zeal to establish skills, must be provided for if the teaching of measurement is to result in functional results.

#### DEVELOPING CONCEPTS OF MEASUREMENT.

1. Children should be taught that all measurement is approximate. While the child may not fully appreciate this concept until he is more mature, he should be given every opportunity to grasp this idea. His weight and height are recorded to the "nearest pound" and the "nearest inch" respectively. Teachers in Grades 4 and 5 should provide many opportunities for measuring in inches, feet, yards, ounces, pounds, pints, quarts, gallons, and in time units, and emphasize the precision or "nearness" to which these measurements are made. The sixth grade teacher then can continue to develop the concept of "approximation" through using illustrations of decimal fractions.

Pupil texts in arithmetic are calling the attention of teacher and children to this concept of approximation. However, much of the responsibility for its continued development lies with the teacher.

The high degree of accuracy required by surveyors, who allow an error of little more than one-twentieth of an inch in a surveying line a mile long, has been pointed out by Schorling and Clark<sup>1</sup>.

2. Children should be given opportunities to see that the fineness of the measurement being made depends upon (1) the use to which the measurement is being put (e.g., babies are weighed on scales which register ounces whereas adults use scales registering nearest pounds); (2), the precision of the tool being used (e.g., fourth and fifth grade children can see the advantage of the use of a tapeline over yardstick or ruler and sixth grade children can become familiar with the micrometer); (3) the skill of the person making the measurement.

3. Children should recognize any of the measuring units apparent to the senses. Every classroom should have rulers, yardsticks, tapelines, scales, and clocks. All kinds and sizes of glass, tin, and paper containers will be brought in by children when studying liquid measure.

In Grade 5, where the concept of area may be developed to take care of social studies reading, square inches, square feet, and square yards of paper should be cut out

1. Schorling, Raleigh and Clark, John R., "Mathematics in Life, Unit A Measurement". World Book Co. 1935, p. 26a.

and used. When the word "acre" occurs in reading, an area the size of an acre should be laid off.

In Grade 6, where the concept of volume may be developed, cubic inches of soap, clay, wood, wax, paper, etc., should be made, and also a cubic foot of cardboard in order that volume units may be visualized as three dimensional.

4. Children will come to know through using these units which belong together in a "table" and which units are used in the purchase of commodities needed at school or at home.

5. Children in the sixth grade can be led to see that our so-called English system really consists of units which for the most part were developed separately according to convenience and were then put into "tables" related as to nature of unit but with no common base. The story of the standardization of units is understandable by children in this grade.

#### DEVELOPING MEASURING SKILLS.

These measuring skills are desirable:

1. Motor and mental skills in measuring.
2. Memorization through use rather than table drill of relation between units in a table; e.g., number of feet in yard.
3. Reasonably useful reductions.
4. Memorization of abbreviations for units.
5. Fundamental processes with compound denominate numbers including adding hours and minutes for pay roll, subtracting years, months, and dates to find age; and, in rural areas, adding pounds and ounces for making mail-order purchases.

#### DEVELOPING JUDGMENT IN MEASUREMENT.

1. Children should be encouraged to interpret quantitative references in their reading; e.g., the child who reads about a dinosaur 90 feet long should measure that distance in the corridor or on the playground. Each teacher should, with the help of her children, make for constant reference a growing list of "yardsticks" for use in interpreting reading.

2. Adult experience is full of situations requiring judgment. The motorist stops his car within reach of gas or air hose, judges distance from hydrant, and length or width of a parking space. The housewife gets to know without asking how many tomatoes, apples, pears, etc. in a pound; how much a certain piece of meat, of a hand of bananas, weighs, how many carrots to cook for her family, etc. Selection of an ice box dish large enough but not too large for storing left-overs of food just purchased or cooked is a daily occasion. Whether there is a cup of milk left in the bottle or a half cup of nut meats in a jar, or how many glasses of fruit juice remain, are common questions in the home.

Through making use of the many activities of life, the school may supplement the home in providing for the development of judgment.

Space does not permit the development in full of objectives, equipment, teaching suggestions, and enrichment possibilities for each of the six "tables" under discussion. Since the skills usually receive most emphasis, we shall suggest those knowledge objectives which are most important for the establishment of functioning skills and judgment.

#### LINEAR MEASURING.

Length, width, breadth, height, depth, altitude, distance, elevation are measured in linear units. Dimensions include length, width, and height. Length and width are a matter of relative size while height or depth is a matter of position. As well as distance down, depth may mean distance from foreground to background; e.g., depth of a house lot.

The concept of perimeter can be developed through discussing situations in which finding the perimeter is necessary; e.g., putting a fence or hedge around a lot or garden; building a playpen for children; sewing edging onto a handkerchief; running bases on a baseball diamond; framing a picture; planning a border for a notebook cover. Pictures which suggest perimeter are not easy to find in magazines or advertising literature. However, pictures which are available may be supplemented by children's drawings in which are portrayed the situations about which they have been talking.

Children will enjoy looking for and making objects to illustrate perimeter. A bordered handkerchief, a picture frame, toy fences, trees and hedge plants to use for borders, are among items used in one such display.

### SQUARE MEASURE.

The "all over" concept of area cannot be developed adequately by definition only. As in developing the concept of perimeter, it should be helpful to note situations in which the finding of areas is necessary; e.g., sweeping, washing, waxing, oiling, sanding, painting floors; rolling, fertilizing, watering, mowing, raking lawns; washing windows; washing or erasing blackboards; sweeping streets and rolling stretches of new highway; ironing tablecloths, etc.

Three dimension models showing figures (made of cardboard or pipe cleaners, etc.) engaged in some of the above activities should be meaningful approaches to the use of shaded diagrams and verbal problems.

The cutting and manipulating of square inches, square feet, and square yards should (1) lead to the recognition of these square units, (2) emphasize the alloverness of area, (3) show the relationship between square units (e.g., 144 square inches equal a square foot;) and (4) show that the area of a rectangle can be found by multiplying the number of square units in one row by the number of rows.

The concept of acre will result from the measurement of the playground or the laying off of an area equal to an acre. Children must understand that the finding of area is not limited to surfaces with measurements in even units; e.g., the area of a table  $3\frac{1}{2}' \times 7\frac{1}{2}'$  as well as of a table  $3' \times 7'$  may be found. An acre need not be in the form of a square, but if it happens to be will measure about 209 feet on a side.

Distinction must be made at some point between the situation calling for area and that based on dimensions. It will be seen that only 24 blotters  $4'' \times 7''$  can be cut from a large blotter  $25''$  by  $28''$  because of the waste in cutting. Unless taught to recognize this type of problem and to diagram its solution, children will treat it as an area situation.

### VOLUME.

As with perimeter and area, volume may, after the introduction of the concept of three dimensions, be approached with situations involving volume; e.g., loading snow, filling sand boxes for sanding roads, grading a lawn, excavating a cellar, filling a coal bin, etc. The capacity of refrigerators and freezing units is quoted in cubic feet. The concept of volume must include both solids and the contents of hollow containers. In the latter case liquid contents may be expressed in gallons.

The use of three-dimension models (e.g., toy trucks or wheelbarrows of sand, miniature boxes of sand or bins of coal, bars of soap for slabs of stone, etc.) may help to carry the idea of volume. The construction and manipulation of cubic inches of wood or other material should serve to emphasize the meaning of volume. Diagrams of cubic inches arranged to form a cubic foot will be more practical than trying to assemble 1728 cubic inches. However, the use of one or more cubic-foot models made of cardboard and Scotch tape will help to give a concept of cubic foot.



## WEIGHT.

Interest in this measure may grow out of the child's own weight, the comparative weights of candy bars as indicated in the section devoted to Consumer Education, the construction of scales, a paper salvage project, the study of best ways of shipping packages, or the baggage allowance in air travel. The wider the weighing experiences of children the better will be their concepts of weight which must come from doing, not from seeing as in earlier measures.

Shopping experiences will show items which are purchased by weight. Charts may be made on which are posted pictures of such goods which will include many items of food, hardware, yarn, grass seed, fertilizer, etc.

## LIQUID MEASURE.

A collection of illustrations of liquid measuring units brought in by the children will no doubt include measuring cups; pint and quart milk containers of glass and paper; half gallon and gallon cider jugs; and may very well lead into the study of the liquid ounce found in nursing and medicine bottles and in cans of fruit juice. The dram bottle used for perfume may also appear.

Recognition of different sized containers and relationship between liquid units should result from the use of such a collection. Consumer uses of liquid units represent a wide range; e.g., beverages, molasses, vinegar, oil, flavoring, cleaning fluids, bleaches and bluing, paint and allied products, as well as items mentioned in the above paragraph.

A free chart published by Libby, McNeill and Libby, Chicago 9, Illinois shows the number of cups in each sized can. This should be helpful in solving some real problems in wise buying.

## DEVELOPING SKILLS IN USING UNITS OF TIME.

Throughout the earlier five measures emphasis has been placed on the development of concepts. In the discussion of time, the need for the development of certain skills will be pointed out. Growth will occur in these grades in finding differences in (1) time within an hour (e.g., using time tables and finding time from 3:19 p.m. to 3:48 p.m. or from 3:48 p.m. to 4:20 p.m.), (2) time elapsed over a period of hours (e.g., finding time from 8:45 a.m. to 5:10 p.m., or from 5:10 p.m. to 11:45 a.m. or from 3:20 p.m. on one day to 2:08 p.m. the following day). Children will, by the end of the sixth grade, be able to find their ages in years, months, days.

Children will also develop skill in solving problems involving the time when a train leaving at 8:35, and requiring 29 minutes for the trip, will reach its destination.

As has been indicated time problems growing out of bus, train, boat, plane or automobile travel will serve to develop skill.

## ENRICHMENT.

Pictures cut from magazines showing or suggesting the use of any measuring unit.

Pictures drawn by children showing or suggesting any measuring situation.

Stories written by the children and illustrated with clippings, labels, or sales slips showing the uses of measuring in a shopping trip, a vacation motor trip, Mother's day at home, etc.

A scrapbook or chart using mounted clippings, labels, or sales slips to illustrate measuring used.

A dramatization of the origins of our present measuring units.

A study of parcel post, railway express and air rates and speeds for packages.

A field trip to see different types of scales, e.g., diamond, drug, candy, meat, vegetable, postage, truck, railway cars.

Construction of scales using pans hanging from the ends of coat hangers. Cooking chocolate is packed in one ounce individually wrapped squares which may be used for balancing boxes of beans or marbles, bundles of cards etc., which in turn become weights.

Construction of these early time-telling devices: (1) sun dials (2) hour glasses, (3) water clocks, (4) fire devices; i.e., striped candles, knotted ropes and lamps.

#### BIBLIOGRAPHY.

American Council on Education, THE STORY OF WEIGHTS AND MEASURES, Committee on Materials of Instruction of the American Council on Education, 5835 Kimbark Avenue, Chicago, Illinois, 1933

American Council on Education, THE STORY OF OUR CALENDAR, Committee on Materials of Instruction of the American Council on Education, 5835 Kimbark Avenue, Chicago, Illinois, 1933

American Council on Education, TELLING TIME THROUGHOUT THE CENTURIES, Committee on Materials of Instruction of the American Council on Education, 5835 Kimbark Avenue, Chicago, Illinois, 1933

Bendick, Jeanne, HOW MUCH AND HOW MANY, McGraw-Hill Book Company, New York, New York, 1947

Bragdon, Lillian J. TELL ME THE TIME, PLEASE, J. B. Lippincott Company, New York, New York, 1936

Flynn, Harry E. and Lund, Chester B. TICK-TOCK—A STORY OF TIME, D. C. Heath Company, Boston, Massachusetts, 1938

Ilin, M. WHAT TIME IS IT? J. B. Lippincott Company, New York, New York, 1932

Metro Publication, WONDERS OF PROGRESS THROUGH THE AGES, Metro Publications, New York, New York.

Palmer, E. Lawrence "LET'S MEASURE THINGS" Cornell Rural School Leaflet Vol. 42, 1, September 1948

Schorling, Raleigh and Clark, John R. MATHEMATICS IN LIFE—UNIT A MEASUREMENT, World Book Company, Yonkers-on-Hudson, New York, 1935

World Book Encyclopedia, "A Study of Time", W. F. Quarrie and Company, 35 East Wacker Drive, Chicago, Illinois

Free materials may be obtained from the following sources:

Ford Motor Company, Detroit, Michigan, "How Long Is a Rod?"

General Motors Corporation, "Automobile Stopping Distance for Different Road Surfaces", 1939

Hamilton Watch Company, Lancaster, Pennsylvania, "Pursuit of Accuracy", 1940

Lufkin Rule Company, Saginaw, Michigan. "The Amazing Story of Measurement", 1949



**GRADE 4: OVERVIEW CHART.****SUBJECT MATTER AREAS AND OBJECTIVES.**

AREAS OF GROWTH	SUBJECT MATTER FIELDS
<p><b>JUDGMENT</b></p> <p>Comparison of numbers met in reading with familiar quantities, sizes, distances, etc.</p> <p>Estimation of range of values within which a sum will fall.</p> <p>Estimation of change from \$1.00; \$2.00; \$5.00; and \$10.00.</p> <p>Approximation of product based on number of places in factors.</p> <p>Estimation of distances and quantities. In problem solving, collection data, selection of steps, and reasonableness of answer.</p>	<p>NUMBER SYSTEMS</p> <hr/> <p>ADDITION</p> <hr/> <p>SUBTRACTION</p> <hr/> <p>MULTIPLICATION</p>
<p><b>WORK HABITS</b></p> <p>Growth in desire and ability to produce prompt, accurate responses.</p> <p>Increasing readiness to apply arithmetic knowledge, and especially denominate numbers, in experience units.</p>	<p>DIVISION</p> <hr/> <p>COMMON FRACTIONS</p>
<p><b>UNDERSTANDING</b></p> <p>See Column.</p>	<p>DENOMINATE NUMBERS</p>
<p><b>SKILLS</b></p> <p>See Column.</p>	<p>GRAPHS</p> <hr/> <p>PROBLEM SOLVING</p>

UNDERSTANDINGS	SKILLS
Conciseness of Hindu-Arabic system compared with difficulties of Roman. Use of Roman as needed.	Reading and interpretation of written numbers; recognition of exact number of objects in small groups without recourse to counting; some judgment in approximating sizes of groups signified by various numbers; some idea of various sums of money.
Continuation from Primary Grades.	Review of 95 decade facts and teaching of 80 remaining facts needed for carrying in multiplication. Increased skill in addition. Checking addition.
Continuation from Primary Grades.	Increased skill in subtraction. Checking subtraction.
Multiplication as a short way of adding like numbers. Language of multiplication. Frequency of uses for multiplication.	The 90 or 100 primary facts. Two-and three-place multiplicand, one-place multipliers, without and with carrying. Two-and three-place multiplicands, two-and three-place multipliers with carrying and more difficulties. Use of United States money in multiplicand. Checking multiplication.
Meaning and language of division.	The 90 primary even division facts. The 360 primary uneven division facts as needed in determining the quotient figure. Division by a one-place divisor using the long division form including zero difficulties. Use of United States money in dividend.
Use of fractions in daily life. Meaning taught objectively as need arises.	Continued use of known fractional units. Only such habits and skills as result from use. No drill.
Necessity for fixed definite preservation of these units. Reason why sales by weight are replacing those by dry measure. Need for selecting suitable containers. Recognition of measuring units and knowledge of commodities for which used.	Necessary ability to select and use correctly the proper units; ability to use measuring equipment.
Interpretation.	
Ability in making and solving real problems. Reading of verbal problems.	Checking computation.

## PLANNED INSTRUCTION IN SUBJECT MATTER AREAS.

### UNDERSTANDING, READING, AND WRITING NUMBERS.

#### Readiness.

It is to be expected that children entering fourth grade will have been using three-place numbers freely. They should be able to read simple amounts in United States money. The teacher will wish to determine to what extent children understand the "place value" and "decimal" features of our number system. Does the child know the relation between positions from objective experience in building numbers or is his reading of numbers purely by rote? Observation of the child at work with objects is the necessary basis of this inventory.

#### Selection, Organization, and Presentation.

For those children whose comprehension seems limited the teacher will wish to provide objective experience. Familiarity with the comparative values of the cent, dime, and dollar make coins the best type of objective materials for first use. The teacher should investigate commercial materials. She should also acquaint herself with motion picture films and film strips.

When the tens (decimal) relations of units to tens, and of tens to hundreds, has been established objectively, the same relation between hundreds and thousands will be understood without the use of objects.

Writing numbers when the teacher reads them the long way, as 3 hundreds 4 tens 5 units, or 3 thousands 5 hundreds 0 tens 4 units, will emphasize place value. Let children show on the board the meaning of 235 as:

$$\begin{array}{r}
 100 \quad 10 \quad 1 \\
 100 \quad 10 \quad 1 \\
 \hline
 200 \quad \text{—} \quad 1 \\
 \quad \quad 30 \quad 1 \\
 \quad \quad \quad \quad \hline
 \quad \quad \quad \quad 5
 \end{array}$$

Since multiplication with three-place multiplicands and multipliers may result in six-place products, recognition of positional values is needed for the reading of these numbers.

The knowledge that the tens relationship between any two positions continues throughout a number should be maintained through obtaining the value of the new position by multiplying the value of the preceding position by ten. Since comprehension of the number system is a matter of growth, complete understanding is not expected at this point. The continuation of this plan in the following grades would result in an understanding that will prepare for the development of the decimal fraction as an extension of the decimal system of integers.

Opinion is divided as to the need for a comma in a four place number; but for numbers with more than four places the comma facilitates reading. The conjunction "and" must not be used in reading whole numbers; e.g., 75,302 is read "seventy-five thousand three hundred two," not "seventy-five thousand and three hundred "and" two. "And" is used only when reading numbers containing common or decimal fractions. Telephone and automobile registration numbers, tables, etc., should be read in telephone number style, as "two-five-two-six"; the maximum of practice should be upon place value reading.

Pupils should often be required to read aloud the answers to their daily arithmetic examples in order to give practice in reading numbers. The teacher should insist that such numbers be read correctly in every case.

Roman numerals through XII will have been learned by the child in telling time. Recognition of larger numbers will result from their occurrence in chapter headings.

Needs for writing numbers are encountered in written arithmetic, in writing of dates, street numbers and scores in games. Writing numbers from dictation is a means of fixing positional arrangement. In writing United States money caution against the use of \$ and ¢ symbols in the same number; e.g., \$2.45¢.

The alert teacher will insist upon the correct formation of figures. Carelessly made figures are often responsible for errors in computation. Newland<sup>1</sup> after examining 135,000 digits made by 1127 children and adults discovered that illegibilities in 2, 5, and 7 tend to persist in different age groups. He suggests making 5 with one stroke and omitting ornamental strokes in 7 and 2.

#### **Drill.**

Formal drill in reading numbers should be unnecessary if the teacher makes use of the opportunities for reading numbers found in informational material and in computation results. Drill upon correct formation of figures will be individual in this grade.

#### **Evaluation.**

No written tests are necessary to determine the understanding of the number system or the skills in reading and writing of numbers possessed by the children in a grade. The observations made by the teacher when the children are using numbers provide the most useful evaluation.

#### **Enrichment.**

Can you come to any end in writing numbers? Allow pupils to experiment.

What is the largest number you can make with any four different figures?

Can you make six different numbers with the figures 2, 3, 4?

The teacher should tell stories to show children how indispensable numbers are. She may lead them to try to imagine a day without numbers.

### **ADDITION.**

#### **MAINTENANCE PROCEDURES.**

Growth and understanding and maintenance of skills developed in Grade 3 are dependent upon continued practice and upon continued use in experience units in the later grades.

The teacher of Grade 4 must determine whether children have learned in the previous grade to add upward first or to add downward, and follow their procedure in this grade until she is certain that they can add in either direction with no confusion and with equal ease. It must be remembered that addition will be used in carrying in multiplication examples and in adding partial products, thus providing much addition maintenance drill in this grade. However, much attention must be given to sets of addition examples in which a large number of primary and upper decade addition facts occur. In these examples it is well to stress "thinking" 7 upon seeing 3 and 4, not saying mentally or whispering "3 and 4 are 7."

#### **REMEDIAL PROCEDURES.**

Some teachers, because they give tests in September before the children have had an opportunity to become accustomed to the habits, manners, and speech of the new teacher, secure poor test results and feel that the previous teacher must have done inferior work, calling for many remedial exercises.

Tests given several days later might have produced much more satisfactory results.

Slow and inaccurate responses in column addition may be due to the difficulty of

1. Newland, Ernest T. "A Study of the Specific Illegibilities Found in the Writing of Arabic Numerals," *Journal of Educational Research*, 21:177-185, March 1930.

adding a "thought of" number to a "seen" number. This difficulty may arise from inability to remember the combination sum long enough to add it to the next number, or from inability to think a sum when one number is unseen especially when the sum lies in the decade above the unseen number, or from lack of mastery of decade facts. Letting children add columns aloud may help the teacher to diagnose the difficulty. As has been indicated, not all children who fail to achieve a perfect score on an addition test should be considered remedial cases. From a test including the 100 primary addition facts and addition process steps it should be possible to discover the presence of (1) faulty functioning in the process of addition and (2) lack of mastery of primary and decade facts. Observation of children taking the test will disclose poor work habits.

Individual work with children showing process step weaknesses will seem to separate those who need a few days use of "refresher" materials or the clarification of minor confusions from those who need to have this work retaught for both meaning and habituation. This grouping is temporary and children will move from one group to another as individual progress dictates.

Many teachers feel that it is better to expose flash cards containing primary facts allowing only time enough for children to say or to write the answer without counting than to have written responses given to written facts, since this latter technique permits counting although the correct answers are obtained.

Difficulty arising from lack of mastery of decade facts may be corrected through reteaching unknown facts by making use of related primary facts. Children should also be helped to see that if the sum of the units is ten or more the sum of the fact will be in the next higher decade with the proper ending based on the primary fact. Before assigning a set of addition examples it is helpful to give drill on the decade addition facts occurring in such examples. Such procedure will not only show the need for drill but will demonstrate in greater speed and confidence the immediate benefit derived from such drill.

In "A Curriculum Guide for Primary Grade Teachers" on pages 308-9 will be found suggestions for the use of cumulative scores in ring toss, shuffleboard, ten pins, and bean bags to give practice on decade facts in an objective setting.

Some difficulty may arise in process steps which do not involve carrying, because the habit of beginning at the right has not been well established. Some remedial work may be necessary with children who are uncertain of procedures when gaps occur.

#### 'CHECKING.

Adding columns in the reverse order seems the best check in this grade. Because facts found in adding downward differ from those met in adding upward, fact errors can in most cases be discovered.

#### EVALUATION.

In "A Curriculum Guide For Primary Grade Teachers," pages 331-33 are devoted to a discussion and illustration of the construction of tests which make use of the 100 primary facts and involve the process steps.

The teacher who takes time to construct her own diagnostic tests in this way will be certain that all facts are tested, and that those facts needing extra emphasis will be used again and again, thus doing away with haphazard testing. The teacher who has tried this plan will not be satisfied to return to tests which have neither been analyzed for fact occurrence nor planned to fit the needs of her particular grade.



## ADDITION. DIAGNOSTIC TEST OF 100 PRIMARY FACTS AND PROCESS STEPS.

(Primary fact) (Sums under 10, single column) (Two-and three-place addends, no carrying)

1) $\begin{array}{r} 4 & 5 & 4 & 5 & 6 \\ 7 & 6 & 9 & 8 & 9 \\ \hline \end{array}$		2) $\begin{array}{r} 1 \\ 1 \\ 3 \\ 2 \\ 2 \\ \hline \end{array}$	3) $\begin{array}{r} 1 \\ 2 \\ 3 \\ 1 \\ 1 \\ \hline \end{array}$	4) $\begin{array}{r} 4 \\ 1 \\ 3 \\ 1 \\ \hline \end{array}$	5) $\begin{array}{r} 31 \\ 14 \\ 21 \\ 32 \\ \hline \end{array}$	6) $\begin{array}{r} 543 \\ 344 \\ \hline \end{array}$
--	--	---	---	--	--	--

(Single addend, sum of 10) (No carrying, sum of left addends over 10) (Zeros, no carrying)

7) $\begin{array}{r} 1 \\ 3 \\ 4 \\ 9 \\ \hline \end{array}$		8) $\begin{array}{r} 2 \\ 4 \\ 1 \\ 6 \\ \hline \end{array}$	9) $\begin{array}{r} 21 \\ 55 \\ 12 \\ 71 \\ \hline \end{array}$	10) $\begin{array}{r} 23 \\ 61 \\ 12 \\ 73 \\ \hline \end{array}$	11) $\begin{array}{r} 210 \\ 400 \\ 264 \\ 103 \\ 822 \\ \hline \end{array}$	12) $\begin{array}{r} 320 \\ 405 \\ 130 \\ 143 \\ 600 \\ \hline \end{array}$
--	--	--	--	---	--	--

(Carrying) 13) $\begin{array}{r} 631 \\ 157 \\ 654 \\ \hline \end{array}$		14) $\begin{array}{r} 243 \\ 625 \\ 998 \\ \hline \end{array}$	(Gaps in addends) 15) $\begin{array}{r} 80 \\ 8 \\ 42 \\ \hline \end{array}$	16) $\begin{array}{r} 6 \\ 750 \\ 389 \\ \hline \end{array}$	17) $\begin{array}{r} 3 \\ 20 \\ 996 \\ \hline \end{array}$
--	--	--	---	--	---

(Money) 18) $\begin{array}{r} \$ .50 \\ 4.09 \\ 9.73 \\ \hline \end{array}$		19) $\begin{array}{r} \$33.10 \\ 31.52 \\ 74.07 \\ 1.82 \\ \hline \end{array}$	20) $\begin{array}{r} \$334.20 \\ 800.07 \\ 98.95 \\ \hline \end{array}$
--	--	--	--

(Examples using above steps)

21) $\begin{array}{r} 680 \\ 2006 \\ 8456 \\ \hline \end{array}$	22) $\begin{array}{r} 200 \\ 63 \\ 705 \\ 35 \\ \hline \end{array}$	23) $\begin{array}{r} \$124.14 \\ 621.55 \\ 975.37 \\ \hline \end{array}$	24) $\begin{array}{r} \$143.80 \\ 400.01 \\ 456.49 \\ \hline \end{array}$	25) $\begin{array}{r} \$686.58 \\ 689.76 \\ \hline \end{array}$
--	---	---	---	---

## ENRICHMENT.

In "A Curriculum Guide for Primary Grade Teachers," the enrichment devices for addition are to be found on Pages 335-36.

**SUBTRACTION.**

## MAINTENANCE PROCEDURES.

The teacher of this grade will continue planned instruction leading to the recognition that answers to the questions "How many are left?", "How many more are needed?", "What is the difference?", "How many of a second kind are there in a whole group when the number of the first kind is known?" are found by subtracting. This last subtraction meaning is referred to as the component idea.

Children should understand the meaning of the terms remainder and difference but in the opinion of many persons need not be expected to use the terms minuend and subtrahend.

The form "4 from 9" is recommended instead of "9 take away 4" even in earliest grades. "Take one" is preferred to "borrow one." Children should be made familiar with various ways of expressing subtraction: subtract 486 from 2687; take 486 from 2687; 2687 — 486; find the difference between 2687 and 486; how many more than 486 is 2687; how many must be added to 486 to make 2687; 2687

486

#### REMEDIAL PROCEDURES.

The teacher by using flash cards as suggested for addition can discover the primary facts which have been imperfectly or erroneously memorized. Many of the drill procedures and materials suggested for primary addition facts in "A Curriculum Guide For Primary Grade Teachers" can be adapted for use with primary subtraction facts.

Tests constructed so as to include all of the process steps and the 100 primary subtraction facts should be used to determine individual difficulties. Remedial work based on the results of these tests may be made to fit the needs of individual children or of groups.

Slowness in doing examples in subtraction is often due to elaborate mental language habits which have been allowed to persist from the rationalizing of the process in the early

937

teaching stage. In the example 189 the child, if asked to say aloud what he thinks, may say, "9 from 7 I cannot take, so I take one ten from the three leaving 2 and make 17; 9 from 17 leaves 8," etc. If such a time-consuming habit has been formed, the teacher should patiently help the children to use the shorter form by having much oral practice using only the necessary words 9 from 17, 8 from 12, 1 from 8.

Probably nowhere is a crutch more commonly used than in subtraction by the borrowing method. Brownell<sup>1</sup> reports that a large percentage but not all of the children who had been taught the crutch or aid "just naturally" gave up using it. He found that the tendency to retain its use needlessly seemed to be related to temperamental traits such as docility and lack of inventiveness, not to chronological or mental age or to intelligence. Some children went gradually from the use of the crutch to its omission. Children tended in any emergency to revert to its use.

Where necessary with individuals or groups, the teacher will stress the formation of these habits:

- (a) The smaller number should always be taken from the larger. If the form "from \$986 take \$147.50" is used, it is not unusual for children to write \$986 as the subtrahend.
- (b) The subtrahend figures must always be taken from the minuend. Occasionally a child will subtract the smaller from the larger digit regardless of position.
- (c) Begin at the right and continue to the last figure on the left.
- (d) When zero is subtracted from a number, the remainder is always the number.
- (e) The remainder or difference must always be smaller than the minuend.
- (f) We omit writing zero when it is the result of the last subtraction in an example.

#### CHECKING.

The most commonly used method of checking subtraction is to add the subtrahend and the remainder. When first taught, the sum is written but this practice should be discontinued. The importance of checking mentally every example, not only mechanically, but more especially on the basis of common sense, should be emphasized.

1. Wm. A. Brownell, "The Place of Crutches in Instruction", *Elementary School Journal*, 34: 607-619, April 1934.

Either of these forms may be used for the written check:

(1)	(2)
487	487
<u>169</u>	<u>169</u>
318	318
<u>487</u>	<u>169</u>
	<u>487</u>

### EVALUATION.

For diagnostic purposes a test containing all process steps and using the 100 primary subtraction facts follows:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
86	435	75	679	\$5.29	847	638	487
34	321	30	104	2.28	104	615	26
<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>
(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
39	147	1210	73	123	114	131	121
5	75	900	37	56	19	59	48
<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>
(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
681	890	215	\$2.59	515	932	337	626
272	604	38	1.77	435	450	142	360
<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>
(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)
567	912	772	950	606	1335	1243	1123
268	877	574	752	439	839	760	969
<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>
(33)	(34)	(35)	(36)	(37)			
1788	\$7.40	\$4.00	5004	\$80.00			
899	.88	3.65	1908	11.26			
<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>			

Let the children bring to class newspaper advertisements containing pictures and lists of prices. Divide the class into pairs, letting one child act as cashier, the other as customer. Each cashier subtracts on paper the cost of the purchase from the \$1.00, \$2.00, \$5.00, or \$10.00 assumed for the moment to have been presented by the customer, who, in turn, checks the subtraction.

### MULTIPLICATION.

#### READINESS.

Readiness for learning multiplication facts and process steps depends upon the development of the meaning of multiplication and upon mastery of the decade addition facts needed for carrying in multiplication.

Many opportunities for introducing the concept of multiplication will have arisen in the first three grades and in the out-of-school experiences of the children. A brief list of in-school activities includes buying or selling cookies, selling tickets, buying milk, marching by twos, buying saving stamps.

Very likely the teachers in the first three grades have called the attention of the children to situations involving several equal groups. The children may have heard these groups spoken of as "two threes" or "five fours." The desirability of using the above expression instead of "three times two" or "five times four" cannot be too greatly emphasized. We

are amused when platform speakers quote the studying of the "tootems family" when we should be concerned that so many children drill on abstract multiplication facts without an adequate concept of multiplication.

The teacher of the third grade will no doubt have called attention to addition examples with like addends; e.g., 5 or 25 which might have been done by multiplication.

$$\begin{array}{r} 5 \quad 25 \\ 5 \quad 25 \\ 5 \quad \text{—} \\ \text{—} \end{array}$$

The teacher of this grade will wish to determine whether or not the 175 decade addition facts needed for carrying in multiplication have been mastered in the third grade where addition is taught. Inventory tests of these facts will be listed later in the discussion of evaluation procedures.

#### PRIMARY MULTIPLICATION FACTS.

How many? Some authors of pupil tests recognize 100 primary multiplication facts while others eliminate the 10 facts with zeros in the multiplier (e.g.,  $\begin{array}{r} 6 \\ 0 \end{array}$ ), leaving 90.

The vertical form (e.g.,  $\begin{array}{r} 2 \\ 6 \end{array}$ ) receives major emphasis although the horizontal form should receive some attention.

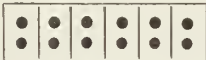
The relation between multiplication and division facts and processes makes it seem desirable to many to teach related multiplication and division facts at the same time in complete unit form; e.g., three fours are twelve, four threes are twelve, twelve has three fours, twelve has four threes. Another organization consists of the building of tables in order to show the interrelationship of facts. These tables are used for the development of understanding not for parrot-like drill. In the absence of conclusive research results, the decision rests with the supervisor or the teacher.

#### Development of Meaning of Primary Facts.

The teacher will find that the average textbook suggests too few situations for developing the meaning of primary facts. The use of pictures and diagrams should be preceded by actual handling of real objects, which the children themselves will make into groups. The teacher who wishes to develop objectively a great many of the primary facts will find helpful the use of cards on each of which a group of objects has been drawn or mounted. The fact in abstract form (e.g.,  $\begin{array}{r} 7 \\ 2 \end{array}$ ) then becomes the meaningful expression for a relationship already discovered.

The discovery by the child through handling objects that both two sixes



and six twos  are twelve will mean much more to him than reading in his text that both 2 and 6 are 12.

$$\begin{array}{r} 6 \quad 2 \\ \text{—} \quad \text{—} \end{array}$$

#### Drill on Primary Multiplication Facts.

The teacher who wishes to be very sure that she is not beginning drill on abstract facts before meaning has been established may wish to use with the children the following questions:

1. Can the children arrange objects in several equal groups following directions such as "Show three fours?" Can they arrange original groups and tell what they are showing? Can they identify groups arranged by teacher?

2. Can the children respond correctly to primary facts given orally in familiar situations; e.g., "How many cookies at 2 for a cent can you buy for three cents?"

3. When showing equal groups such as "four threes" do they if asked "three fours" recognize its relation to "four threes" or do they respond to it as a new situation? As soon as drill on primary facts is begun this concept will be used in teaching reverses of facts at same time as facts themselves.

4. Do the children know the written forms for multiplication facts, e.g., can they write the fact referred to in question 2 as 2 or 2?

$$\begin{array}{r} 2 \quad 3 \\ 2 \quad - \\ \hline \end{array}$$

5. Will a situation involving several equal addends of two place numbers be written and solved by the children as a multiplication example with no mention of addition? Or will some situations be handled by addition?

At one time the facts were taught in table form with little or no presentation. Children memorized them in order and whispered the table up to the required point when they wished to know any particular fact. Because of this the responses were necessarily slow. Objections to the learning of multiplication facts in table form are (1) associations are formed between successive facts without a clear connection between the factors and their product; (2) earlier facts in each table and the easier tables are greatly overlearned while more difficult facts receive too few repetitions; (3) many well-meaning teachers neglect to provide random drill sufficient to make automatic the response to the isolated fact; (4) reverses are not taught at the same time as facts to which they are related.

Plenty of opportunity must be given for establishing the association of the product with the combination before attempting recall. The "magic multiplying pencil," a commercial device on which rotating band brings combination and answer together, may well be used at this stage. Flashcards about 4" x 7" should be posted with side containing answer visible. Individual flashcards about 2" x 3" may be made by the children. Emphasize and check the correct copying of answers. Every precaution should be taken to prevent children from forming incorrect associations between combinations and products. Norem and Knight<sup>1</sup> found that a large percent of errors given in response to multiplication combinations were correct responses to some other multiplication combination; e.g., 7 eights are 54. The teacher who knows that such danger exists can guard against it.

Using the individual self-made flash cards the child plays "solitaire" by placing in a pile for further study those cards whose products are not immediately recalled. In the Play School plan the class is divided into groups of two, one acting as teacher and the other as pupil. The first asks for eight 2's or five 4's and verifies the result given from the reverse side of his own card. Self-checking drill devices are good at this stage. A list of commercial devices may be obtained by writing to the Arithmetic Materials Bureau, State Teachers College, Salem, Massachusetts, Miss Mildred Stone, Chairman.

The following devices may be used when drill is to promote overlearning. Even at this stage if a child is uncertain of an answer he should "look it up" and not resort to guessing.

Display large cards each bearing a number such as 36, 24, 72. As each child sees the card he writes a multiplication fact such as six 6's are 36, three 8's are 24, four 6's are 24. A similar scheme is used for division.

One-figure numbers may be placed on the board 6 8 3 5 9 2 7 1 4 and pointed to in

1. Norem, G. M. and Knight, F. B., "The Learning of the One Hundred Multiplication Combinations," Report of Society's Committee on Arithmetic. National Society for Study of Education Twenty-Ninth Yearbook, p. 551-568.

random order by the teacher who says, "We shall add each of these numbers to 36, 27, or 16." Each child writes the correct response. A pre-arranged order must be used by the teacher so that she may use the results for diagnostic and remedial purposes.

Probably every teacher has used some form of Bingo for multiplication fact drill.

Cards 2" x 3" containing primary multiplication facts may be inserted in envelopes mounted on charts and bearing products of primary multiplication facts. These will be checked later by teacher or by other children.

### Multiplication Process Steps.

Lack of space prevents the presentation of process steps. Excellent gradation and method of presentation may be found in current textbooks.

It may be well to remind the teacher of the need for a review of the decade addition facts required for carrying in multiplication.

### EVALUATION.

Written flash card drill in which the teacher flashes cards and each child writes responses is a quick method of testing all children on all the facts and forms a basis for individual remedial work. The advantage of this drill over the printed test form is that the short interval of exposure leaves no time for counting.

For testing mastery of primary multiplication facts, several forms of the 100 facts should be duplicated in order that a test which has been given may be used by the child for study with no danger that a fact will be associated with its position on the test.

Since the 175 decade facts needed in carrying in multiplication are to be reviewed or taught in this grade, several forms of these facts should be available. If desired the 95 facts already learned as a part of the 300 decade facts needed for column addition may comprise one test while the 80 facts needed for carrying in multiplication only may comprise another.

The number of tests which a teacher uses will depend upon her class and the use she wishes to make of such tests. At least one or more forms for testing multiplication with one-place multiplier will be needed.

This test contains all types of examples in the multiplication process and all of the 100 primary facts.

$\begin{array}{r} 234 \\ 2 \\ \hline \end{array}$	$\begin{array}{r} 73 \\ 400 \\ \hline \end{array}$	$\begin{array}{r} 105 \\ 17 \\ \hline \end{array}$	$\begin{array}{r} 315 \\ 4 \\ \hline \end{array}$	$\begin{array}{r} 36 \\ 4000 \\ \hline \end{array}$
$\begin{array}{r} 932 \\ 32 \\ \hline \end{array}$	$\begin{array}{r} 463 \\ 521 \\ \hline \end{array}$	$\begin{array}{r} 30 \\ 8 \\ \hline \end{array}$	$\begin{array}{r} 918 \\ 51 \\ \hline \end{array}$	$\begin{array}{r} 735 \\ 326 \\ \hline \end{array}$
$\begin{array}{r} 4008 \\ 35 \\ \hline \end{array}$	$\begin{array}{r} 850 \\ 4 \\ \hline \end{array}$	$\begin{array}{r} 41 \\ 63 \\ \hline \end{array}$	$\begin{array}{r} 122 \\ 312 \\ \hline \end{array}$	$\begin{array}{r} 467 \\ 8 \\ \hline \end{array}$
$\begin{array}{r} 900 \\ 7 \\ \hline \end{array}$	$\begin{array}{r} 243 \\ 45 \\ \hline \end{array}$	$\begin{array}{r} 726 \\ 489 \\ \hline \end{array}$	$\begin{array}{r} 403 \\ 3 \\ \hline \end{array}$	$\begin{array}{r} 869 \\ 67 \\ \hline \end{array}$
$\begin{array}{r} 962 \\ 365 \\ \hline \end{array}$	$\begin{array}{r} 8004 \\ 2 \\ \hline \end{array}$	$\begin{array}{r} 967 \\ 12 \\ \hline \end{array}$	$\begin{array}{r} 437 \\ 907 \\ \hline \end{array}$	$\begin{array}{r} 307 \\ 5 \\ \hline \end{array}$
$\begin{array}{r} 870 \\ 69 \\ \hline \end{array}$	$\begin{array}{r} 268 \\ 807 \\ \hline \end{array}$	$\begin{array}{r} 64 \\ 20 \\ \hline \end{array}$	$\begin{array}{r} 519 \\ 84 \\ \hline \end{array}$	$\begin{array}{r} 1059 \\ 905 \\ \hline \end{array}$
$\begin{array}{r} 350 \\ 4700 \\ \hline \end{array}$				

**CHECKING.**

Until division is understood, checking is done by multiplication in the reverse order, or by repeating the process.

**DIVISION.****READINESS.**

Readiness for learning the division facts and process steps depends upon the development of the meaning of division. Division situations are concerned with finding the number of articles in a group when the number of groups is given, or with finding the number of groups when the number of articles in a group is given. Finding daily lunch allowance by dividing weekly budget by five illustrates the former, whereas finding the number of three cent stamps that can be bought for fifteen cents illustrates the latter. The teacher must see that children recognize both types of situations as calling for division.

Not so many real uses for division as for multiplication will have arisen in the Units of Work in Grade 3. Therefore more work with objects will be necessary in order that division meaning shall precede drill. However, the teacher of Grade 4 should know what experience her class has had with division in earlier units.

To determine division concepts possessed by her children, the teacher will wish to obtain answers to the following questions:

1. Can the children show how many fours there are in 12? In doing this do they make four groups and place three objects in each group or do they make three groups of four objects?

2. Can the children show one-fourth of eight? Do their responses indicate four groups of two objects or two groups of four?

3. Can the children respond correctly to primary facts given orally in familiar situations; e.g., "How many cookies at two cents each can you buy for six cents?" and "Eight pieces of candy are divided equally among four boys. How many will each receive?"

4. When showing that twelve contains "four threes" do they see its relation to "three fours" or do they respond to it as a new situation?

This concept will be used as soon as drill on primary facts is begun through teaching reverses of facts at the same time as the facts themselves.

5. Do children make use of multiplication in arriving at answers to division questions?

Subject matter readiness for division with a one-place divisor using the long term depends upon mastery of primary multiplication, division, and subtraction facts, and of subtraction steps with and without borrowing. Division with a one-place divisor using the short form calls for an additional 175 decade subtraction facts.

**LANGUAGE**

The forms "How many eights are there in 72?" and " $\frac{1}{8}$  of 72" have replaced the "8 goes into 72" which frequently because of lack of meaning became a "guzzinter". While the sign of division must be understood, it is used but little except in school. The forms  $8 \overline{) 72}$ ,  $8 \overline{) 72}$ ,  $\frac{1}{8}$  of 72, and  $72 \overline{) 8}$  must be taught. Some writers advocate using  $72 \overline{) 8}$  because it serves fractions as well as division, can be typewritten and makes possible the performing of a series of multiplication and division processes without the labor of rewriting.

**SELECTION, ORGANIZATION, AND TEACHING OF PRIMARY FACTS.****Division Facts.**

There are 90 primary even division facts, including those with divisors 1 through 9 and quotients 0 through 9. Division by 0 is never needed, which accounts for the decreased number of facts.

There are 360 primary uneven division facts with divisors 2 through 9, and quotients 0 through 9.

The order in which the facts are taught may be decided by the teacher or she may adopt one of several that have been recommended by various authorities. Whether the facts are arranged in a progressively harder order of difficulty, or two or more harder ones are grouped with several of the easier is immaterial as long as one adopts random grouping.

The following plans have been used successfully for teaching primary facts.

**Even primary facts.** One child calls 12 others to the front of the room and arranges  
 $4\overline{)12}$        $3\overline{)12}$  them in groups of 4, then lets another child count the number of groups, and a third writes the fact on the board. After the same fact has been built with other materials, problems are made. The  $\frac{1}{4}$  of 12 idea may be brought out by the teacher in a problem such as finding how many cents Jane receives if 12 cents are divided evenly among four children. Possibly the easiest way to clarify the idea is to distribute the 12 cents among the children one cent at a time until all have been distributed. Present the idea of fourths and the number of cents received by Jane when she has one of the fourths.

$3\overline{)12}$  is taught in the same way.

**Uneven primary facts.**

$$\begin{array}{r} 3 \\ 2\overline{)7} \\ \underline{6} \\ 1 \end{array} \quad \begin{array}{r} 2 \\ 3\overline{)7} \\ \underline{6} \\ 1 \end{array}$$

We wish to find how many groups of 2 there are in 7. Let us take 7 pencils and see how many two's we can make. There are 3 two's, and 1 toward making another group of 2.

**Drill facts.** A large card may bear this;  $\frac{1}{4}$  of  $\quad = \quad$ . Then a smaller card with 16, 32, or 20 is slipped into the space before the sign of equality and the child tells the result orally or in writing.

Write a number such as 486 on the board. Let half of the children multiply by 8, then divide by 6, and the others divide by 6 and multiply by 8.

Display large cards each bearing a number such as 36, 24, 72. As each child sees the card he writes a division fact such as  $\frac{36}{6} = 6$ ,  $\frac{24}{8} = 3$ ,  $\frac{72}{9} = 8$ .

## DIVISION OF DIVIDENDS BY ONE-PLACE DIVISORS.

The long division form versus the short division form for one-place divisors. The distinction between the long and short division forms lies in the amount of work shown in the computation, not in the number of digits in the divisor. In the short form the work is done mentally, only the answer appearing while all of the work is shown in the long form.

$$\begin{array}{r} 87 \\ 8\overline{)696} \end{array} \quad \text{and} \quad \begin{array}{r} 29 \\ 25\overline{)725} \end{array} \quad \text{illustrate the short form, while}$$

$$\begin{array}{r} 87 \\ 8\overline{)696} \\ \underline{64} \\ 56 \\ \underline{56} \\ 0 \end{array} \quad \text{and} \quad \begin{array}{r} 29 \\ 25\overline{)725} \\ \underline{50} \\ 225 \\ \underline{225} \\ 0 \end{array} \quad \text{illustrate the long form.}$$

During the last few years there has been discussion as to whether the short form of division should be taught. One argument for the elimination of the short division form for all pupils in the lower grades and for many in the higher grades is that the decade facts in subtraction need not be taught at all if only the long form is used. Another advantage of the long form over the short form in division by a one-place divisor lies in the degree of mastery



needed on the 360 primary uneven division facts. In case the long division form for a one-place divisor is taught first, it is necessary that the children know only the quotient figure in an uneven division fact; e.g., 45 has seven 6's. The remainder will be found by written subtraction. But when the short division form for one-place divisor is taught before the long division form, it is necessary that the children shall know both quotient and remainder in an uneven division fact; e.g., 45 has seven 6's and 3 toward another group.

Grossnickle<sup>1</sup> after having given a test to children in grades 5 through 12 and to students in each year of a three-year normal school course, reported that all using the long division form divided much more accurately than did those who used the short division form, although the latter worked more quickly. The significant difference in time occurred in performing the easy examples. A study by Lenore John<sup>2</sup> in Grade 5 supports the above report as to superior accuracy obtained by use of the long form.

Results of research seem to show that understanding is surer, work is done with greater speed as well as accuracy, and the attention span does not fag so quickly in the long form.

The tendency seems to be toward teaching the short form only as a short cut after the children have had much experience in the use of the long form. Many children of high mentality will begin to leave out some steps themselves without being taught. While in some examples like 3)963 the short form could be used easily, if the long form is used there is the advantage of teaching the method of procedure in examples that are so simple that the child can center his attention on one thing—the different steps and their sequence.

**CHECKING.** The simplest and most practical method of checking division at this point is by use of multiplication.

#### **EVALUATION.**

Several forms of the 90 primary even division facts will be needed for test purposes. Four ninety-fact tests on primary uneven facts will be easier than one test of 360 facts.

#### **BUSINESS FORMS.**

##### **READINESS.**

The habit of giving and of accepting receipts, unfortunately not acquired by many adults, can be better built by the long term experience of using receipts when a need for them arises than by the brief formal treatment usually delayed to later grades. Likewise the correct use of bills is a matter of habit developed over a period of time.

Some simple questions can be asked which will show how much knowledge concerning these forms children have acquired from their out-of-school experiences.

##### **RECEIPTS.**

There are numerous school occasions where children pay money to one another or to the teacher, such as paying for subscriptions to current event readers, contributing to the junior Red Cross, or other service organizations, making a room contribution for some school cause, etc. Some simple receipt form may be duplicated and copies be made available to the children who are acting as collectors. Instead of letting one child collect money for the whole grade, one child in each row may be collector for that row. In this way more children may have experience in using receipts and less time will be consumed in the collecting process. Since adults in

1. Grossnickle, Foster E. "An Experiment in Short and Long Division with One-Figure Divisor," *Elementary School Journal*, March, April 1934.
2. John, Lenore, "The Effect of Using the Long-Division Form in Teaching Division by One-Digit Numbers." *Elementary School Journal* 30: 675-692 May 1930.

their non-vocational life are frequently faced with the task of collecting dues, contributions, etc., this training is well worth-while. A teacher may wish to use the commercial receipt book for receipts given by her class to persons outside school, but will find the classroom duplicated form usable for the children.

Below is a copy of a receipt form such as is used in receipt books.

---

\_\_\_\_\_ 19\_\_\_\_\_ 19\_\_\_\_\_

TO \_\_\_\_\_ RECEIVED of \_\_\_\_\_

\_\_\_\_\_ Dollars

FOR \_\_\_\_\_ 100

\_\_\_\_\_

AMT. \$ \_\_\_\_\_ \$ \_\_\_\_\_

---

#### BILLS.

An examination may be made of bills for goods purchased and for services rendered to discover what use these bills have in common. The teacher who lets her own money be used for buying supplies for a candy sale, for paper for valentines or Christmas cards or for other purposes should present a bill to the class upon completion of the sale. A class selling milk, or Christmas cards, etc., to teachers in the building should present a bill in each case. Simple bill forms may be duplicated for use by the children.

#### MONEY ORDERS.

When the orders for the Weekly Reader or for aquarium plants, etc., are sent it may be possible for a committee of children to go to the post office and purchase the money orders.

#### GRAPHS.

Graphs made in depicting sales of savings stamps, contributions of waste paper, milk or cookie sales, or extent of class progress, even though largely teacher-made, are much more meaningful than are the graphs found in books.



**GRADE 5: OVERVIEW CHART.****SUBJECT MATTER AREAS AND OBJECTIVES.**

AREAS OF GROWTH	MAJOR FIELDS
<p><b>JUDGMENT</b></p> <p>Comparison of numbers met in reading with familiar quantities, sizes, distances, etc.</p> <p>Estimation of size of result of computation.</p> <p>Arrangement of fractional parts of an object, and of symbols (of fractions) according to size.</p> <p>Estimation of linear distances, areas, weight, and liquid contents. Reading values in graphs.</p>	<p>NUMBER SYSTEMS</p> <hr/> <p>ADDITION</p> <hr/> <p>SUBTRACTION</p> <hr/> <p>MULTIPLICATION</p> <hr/> <p>DIVISION</p>
<p><b>WORK HABITS</b></p> <p>Confidence in ability to compute correctly.</p> <p>Enjoyment in manipulating fractional parts of objects.</p> <p>Desire to be businesslike.</p> <p>Habit of planning, recording, and watching one's own improvement.</p>	<p>COMMON FRACTIONS</p> <hr/> <p>MEASUREMENT DENOMINATE NUMBERS</p>
<p><b>UNDERSTANDING</b></p> <p>See column.</p>	<p>BUSINESS FORMS</p>
<p><b>SKILLS</b></p> <p>See column.</p>	<p>GRAPHS</p>

UNDERSTANDINGS	SKILLS
Increased understanding of place-value and decimal features of Hindu-Arabic number system.	Correct reading of any numbers occurring in reading or in computation.
Continuation from Grade 4.	Maintenance drill. Speed commensurate with child's ability.
Continuation from Grade 4.	Maintenance drill. Speed commensurate with child's ability.
Continuation from Grade 4.	Maintenance drill. Speed commensurate with child's ability.
Understanding of process and steps based on experimentation and rational approach.	Division with two-place divisor when trial quotient is true quotient.
Understanding fraction as (1) part of a whole; (2) part of a group; (3) comparison of two objects or two groups; and (4) an indication of division. Interest in fraction uses.	Addition of fractions and mixed numbers with like and related denominators. Subtraction of fractions and mixed numbers with like and with related denominators. Multiplication of fractions and mixed numbers by integers.
Recognition of measuring units. Knowledge of use of units in purchases. Understanding approximate nature of measurement. Distinction between linear and area concepts. General interest in size of objects.	Motor ability in measuring. Memorization of relations between units and subsequent reductions. Abbreviations of units.
Interpretation of bills.	Habit of giving and expecting receipts upon receiving or paying money.
Reading bar and broken line graphs. Interpretation of any other type of graphs as need arises.	Construction of bar and broken line graphs to portray data growing out of children's own experiences.

**GRADE 5: PLANNED INSTRUCTION IN SUBJECT MATTER AREAS.****UNDERSTANDING, READING, AND WRITING NUMBERS.**

## READINESS.

**Hindu-Arabic System.** The fifth grade teacher should find out at the beginning of the year the extent of the pupil's understanding of the decimal base and of the place-value ideas of our number system.

## SELECTION AND ORGANIZATION OF SUBJECT MATTER.

**Hindu-Arabic System.** Use of objective material, money preferably, may be continued, to make clear the fact that a figure in any place has ten times the value of the same figure in the next place to the right. Ask questions such as, "In the number 4684 (pointing) what does the 8 mean? In 3333, this 3 (pointing) means 3 what? the next 3? and so on.

Demonstrating the way to represent numbers on an abacus, as the ancient Romans did and as many Chinese do today, will prove interesting and will help to make clear the meaning of place value. The empty wire on the abacus where there are no counters of a particular order may be compared to the use of the zero as a place-holder in our system.

Newspaper clippings and excerpts from the geography text will create a need for knowing how to read large numbers. To give further practice, the answers obtained in examples in multiplication should be read.

Divide a number of over four places into periods of three figures, emphasizing that we begin at the right and give each group its name.

The word **and**, as noted in the grade 4 outline, should not be allowed in reading integers. The pupils should notice that the left hand group may have one, two, or three figures.

The need for writing large numbers is much less frequent than for reading.

**The Roman System.** Teaching Roman numerals beyond those needed in reading the numbers of chapters in books may be considered informational and not drill material. Children in grade five may be interested in knowing how to read dates represented by the Roman numerals, as they are often found on monuments or over the doors of public buildings. Reading these will involve knowing the values of the seven letters used and the manner in which these letters are combined to form numbers. An important point to stress is that each letter has the same value wherever it is placed. The pupils will appreciate the simplicity of our system by comparing the two methods of writing such numbers as 58 and LVIII or 1807 and MDCCCVII.

## DRILL.

Place on the blackboard for practice lists of numbers copied from the newspapers; or found in the geography text. If opportunities for reading numbers occurring in arithmetic and other lessons are utilized, there will be little need for formal drill.

Occasional practice in writing numbers may be given by dictating numbers to be written. This will disclose any need for individual help.

## EVALUATION.

Formal testing is unnecessary.

## ENRICHMENT.

Use of the abacus is interesting.

Writing the same numbers in the Roman and Hindu-Arabic systems will show the comparative simplicity of the latter.

Listing any Roman numerals found on local public buildings.

## MAINTENANCE AND REMEDIAL PROCEDURES FOR ADDITION, SUBTRACTION, AND MULTIPLICATION.

Facts. The teacher who will make time to let each child run through the primary facts as the cards are exposed will really know which facts the child has mastered. Any slow response may be investigated by letting the child think aloud. Although on written test responses the teacher may not discover whether the child knows the fact or "figures it out", work based on the written test is infinitely preferred to the blind administration of drill to all regardless of need. If written tests are to be used, several forms each of the 100 primary addition, subtraction, and multiplication facts should be available. Common errors in facts may be thus discovered, but for the most part drill will be individual. The use of individual flash cards by the children as a form of solitaire, by the children in pairs, and by small groups, will help to provide remedial drill.

Drill periods should be short and interest should be stimulated by keeping cumulative individual and class scores from week to week. Line graphs will prove useful here.

Mistakes in multiplication examples with carrying may show a need for remedial drill on the decade addition facts. Here as in the primary facts, diagnosis will provide a basis for individual drill. Practice in **oral** addition is especially useful in maintaining or acquiring mastery of the decade addition facts.

Process steps. Lists of typical process step errors in addition, in subtraction, and in multiplication may be compiled by the teachers in a building or school system.

## DIVISION.

### READINESS.

Readiness for division by a two-place divisor depends upon mastery of division with a one-place divisor. The necessary subject matter for division by a one-place divisor includes the 90 primary even division facts, the 100 primary subtraction facts, the 90 or 100 primary multiplication facts, subtraction of two-place numbers without and with borrowing, and the steps in a division example. In addition to these skills division with a two-place divisor requires multiplication without and with carrying and subtraction of three- and four-place numbers. Mastery should not exceed point of use of five-place dividend and two-place divisor when the trial quotient is the true quotient.

### SELECTION AND PRESENTATION OF SUBJECT MATTER.

There are two distinct methods of estimating the quotient figure, the apparent and the increase-by-one. In the former the first figure of the divisor becomes a guide figure and in the latter this guide figure is increased by one when the units figure is five or more. In the former method the necessary changes of quotient figure are always decreases, while in the latter they may be either decreases or increases. Grossnickle<sup>1</sup> says that in 63.94 per cent of possible cases when each of the quotients and each of the divisors contain two figures, the apparent quotient is the true quotient, while by use of the increase by one rule the estimated quotient is the true quotient in 78.23 per cent of the cases. He also states that in 99.23 per cent of the cases the apparent quotient is either the true quotient or only one removed from the true quotient.

The teacher should guide the child to use his judgment as to location of the first figure of the quotient. Soon he will find that the first quotient figure should always be placed over

1. Grossnickle, F. E. "How to Estimate the Quotient Figure in Long Division", *Elementary School Journal* 32: 299-306. December 1931.

the last figure of the first partial dividend, and that thereafter a figure must be placed over each figure of the dividend.

#### DRILL.

Much mental-oral drill in telling whether a number is nearer 20 or 30, 50 or 60, etc., may be given. Since estimation of the quotient figure is a major source of difficulty, much time should be spent on the estimating and placing of the first quotient figure without completing the example.

In each step a sample solution should be left before the children and each step in the example which they do should be worked out with them. Only when a child is confident of the steps should he be given work to do independently.

#### EVALUATION.

Before the teacher starts division with a two-place divisor she will wish to ensure mastery of primary addition, subtraction, multiplication, and even and uneven division facts. Decade addition facts will be needed as will subtraction of two- and three-place numbers and multiplication with one-place multiplier without and with carrying. Tests covering the different division steps will be needed as well as a test on the steps as a whole.

#### MEANING OF COMMON FRACTIONS.

##### READINESS.

The teacher of Grade 5 who considers that the time early in the year, when long division is being taught is the period in which to build fraction meanings, will not need to spend so much time later when beginning the work with fractions.

Pupils during the first four grades have been gradually enlarging their concepts of fractional parts. In the first two grades the concept of one-half has been developed and children recognize that the two halves must be the same size; one pint is seen to be one-half of a quart. In Grades 3 and 4 fractional parts of numbers have been found in connection with the basic multiplication and division facts; e.g., four 4's are 16, one fourth of 16 is 4. In these early grades the pupils will have had many opportunities to use the fraction idea.

A study of the Units of Work and lists of number uses of the first four grades with particular attention to the common fraction outcomes will suggest to the teacher the fraction meanings with which her class is likely to have some acquaintance. Research relating to common fraction meanings such as that made by Polkinghorne<sup>1</sup> may also offer some light on the amount and nature of fraction understanding possessed by children.

Any test planned to discover knowledge of fraction meanings must not depend too much upon the use of fraction symbols. On the other hand too many children can write fraction symbols which have little or no meaning for them. Observation of children working concrete materials will be more valuable at this point than too much written testing.

#### SELECTION AND ORGANIZATION OF SUBJECT MATTER.

**Socially Useful Fractions.** **Informational Uses.** Informational uses of common fractions exceed in frequency computational uses. Clothing sizes, widths of ribbon or elastic, lengths of screws, etc., illustrate common consumer uses. Comprehension of content read or heard often requires understanding of fractions.

1. Polkinghorne, Ada Ruth "The Concepts of Fractions of Children in the Primary School", Masters Thesis 1929, University of Chicago.



Judgment in relation to fractions occurs when in the purchase of ribbon or cloth we estimate the amount needed. In cutting pies, grapefruit, and melons into pieces, and in dividing two chocolate bars among three persons, the need for judgment is evident.

**Computational Uses.** The most socially useful fractions are those whose denominators are 2, 4, 8, and 3. Emphasis in computation with fractions should be limited for the most part to those with the above denominators. Enough objective work should be done with other fractions for children to realize that an object can be divided into any number of parts and that we may work with any number of these parts.

**Fraction Concepts.** The teacher will be aware of the numerous fraction meanings: (a) part of a whole, (b) part of a group, (c) ratio or comparison, and (d) indicated division.

The first of these concepts (viz., part of a whole) is the earliest concept acquired by the child. Dividing fruit into halves, pies into sixths or eighths, and dividing paper into parts are illustrations that come immediately to mind. The use of fractional parts of the inch in making models, charts, etc., in social studies; fractional parts of the cup and teaspoon in making candy; the half yard in making hair ribbon bows for Junior Red Cross boxes are further illustrations.

Polkinghorne found that the concept, part of a whole, was best known by the children whom she tested. In this concept, as in the others, unit fractions were better known than other types of proper fractions. One half was best known when used to designate part of a single object.

The concept of the fraction used to express part of a group was found by Polkinghorne to be less well known than the fraction used in the comparison of two objects. Typical occurrences of this concept, those in which the part used is expressed by a unit fraction, become division situations in our thinking; e.g., the class of 33 children divided into three committees, one half of the boys go to manual training class at one time, etc. Only when we need a part not expressed by a unit fraction do we need to think fractions.

The concept of the fraction used to express a ratio between two objects was better known in unit fraction form, than the ratio between two groups of objects, according to Polkinghorne; e.g., the concept that "this" pencil is half as long as "that" seems easier than the concept "this" group of pennies contains half as many as "that".

Some writers recognize a need for expressing the dividing of a group of objects into several parts. Finding that three chocolate bars divided among four children allows  $\frac{3}{4}$  of a bar for each child is a different concept than indicating  $\frac{3}{4}$  of a chocolate bar.

It is not necessary for the children to know that there are several fraction concepts or to be given formal teaching to develop them. The teacher will wish to watch for evidence of a knowledge of these meanings and may by the use of diagrams and of problems, test from time to time growth of these concepts.

### **Fraction Meanings Precede Fraction Symbols.**

As has been intimated in the paragraphs above, it often happens that too little time is spent on the development of fraction concepts before beginning to express these values in symbols. McCarthy<sup>1</sup> describes the procedure in one school as follows: "At the start of the year, in class discussions we enumerate things which are divided, or may be thought of as divided, into equal parts: a quarter into nickels or pennies; a day into hours; a room window into twelve panes, and so on through a great many such. We then see how these parts may be talked about fractionally: a pane is one twelfth of a window; two nickels are two fifths of a quarter. We estimate distances, areas and volumes fractionally; but during these first two weeks or more no Hindu-Arabic symbols are used—or seen, for we use no textbook. When

1. "Arithmetic in Modern Schools—A Symposium" by several writers contains a description of Mathematics at Shady Hill School, Cambridge by McCarthy, James P., *Progressive Education* 17:20, March, 1940.

the class has had considerable experience with fractional parts in this way, we introduce the symbol and show carefully its scheme of representation." Pupils should recognize the slant form  $\frac{3}{4}$ , as it may be met in printed matter.

Probably the best way to teach meanings of fractional parts is by letting the children take wholes and make them into equal parts. Apples, soft cookies, sheets of arithmetic paper are easily handled material. Each child may be provided with several sheets of arithmetic paper. Under the teacher's supervision he makes one into halves, (testing the two parts to be sure that they are exactly alike), another into fourths, others into eighths, sixths, etc. He compares his halves, fourths, etc., with whole units to see how many of each are required to equal one of these wholes. All these parts should be labelled. He may make a chart showing what he has learned from experimentation. He keeps these parts for use in expressing mixed numbers as improper fractions, improper fractions as mixed numbers, expressing in simpler terms, in addition and subtraction of common fractions. He may also do the same thing with circles cut from paper. The teacher should also have large charts kept from year to year to illustrate fractional parts.

The idea that the denominator shows the number of equal parts in the unit or group may be made clear by use of this same material. After having made clear thirds, for instance, the teacher may give one to a child, saying, "I gave Mary one of the three equal parts. I write it this way,  $\frac{1}{3}$ ". She may continue with  $\frac{3}{4}$ ,  $\frac{1}{8}$ ,  $\frac{3}{8}$ , etc., thus demonstrating the fact that the numerator, or number above the line shows how many of the equal parts expressed by the denominator or number below the line are being considered. Pupils should also apply the fraction idea to many concrete things.

Descriptions of numerous models, for use in developing fraction concepts, which are on display in the Arithmetic Materials Bureau at the State Teachers College at Salem, will be sent upon application to Mildred B. Stone, chairman.

Recognition and understanding of the meaning of the terms numerator, denominator, proper and improper fractions, and mixed numbers are more important than ability to recite formal definitions. The concept of a proper fraction as one whose value is less than a whole seems more meaningful than the usual comparison of numerator and denominator values. Such directions as "Read the fractions which are less than one; those equal to more than one; those equal to one; read the mixed numbers; read the improper fractions; which number in  $\frac{3}{4}$  tells into how many parts the unit is divided" will determine the extent of understanding. Pupils may be asked to arrange in order of their value such fractions as  $\frac{1}{2}$ ,  $\frac{1}{6}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ . This tests their knowledge of the fact that if the numerators are alike the larger denominator the smaller the part.

Diagrams for developing fraction meanings may be used in addition to the actual objective materials. Textbooks almost invariably contain excellent diagrams.

**Equivalent Fractions.** As soon as children recognize unit fractions such as  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ , etc., and begin to work objectively with larger numerators they will begin to use fractions such as two fourths, four eighths, and two eighths whose simpler form is more commonly used. Keep the work in fractions **meaningful** by the use of concrete material. Have on display for ready reference charts showing the relation of halves, fourths, and eighths; halves, fourths, and twelfths; thirds, sixths, and twelfths. These charts will make clear the equality of various commonly-used fractions. The ruler is useful in showing the relation of the fractions  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ ,  $\frac{1}{16}$ . Much **oral** practice in choosing equivalent fractions from a list and in giving fractions, with larger or smaller denominators, equal to a given fraction will facilitate work in addition and subtraction of fractions. Writing all the steps will be unnecessary if the pupils are sufficiently familiar with the equivalence of the most used fraction such as  $\frac{1}{2} = \frac{2}{4}$  or  $\frac{4}{8}$  or the reverse.

**DRILL.**

Since meaning is not developed by drill but by experience there will be no formal drill on this phase of work.

**EVALUATION.**

The fifth grade teacher should inventory the children's knowledge of fractions. She may perhaps assume that children know that, if anything is divided into three **equal** parts, the parts are called thirds; or if into four equal parts, they are called fourths, and so on; but she should not proceed without finding out how clear their understanding is.

**ENRICHMENT.**

Children may make charts or scrapbooks with mounted clippings from newspapers showing uses of common fractions.

Keep a class diary called, "How Grade 5 Uses Fractions". Encourage children to record in the diary their own fraction uses and those of their parents.

Write a story in which fractions are used. Let children see how many fractions they can find in the story. Encourage children to write a paragraph in the same way.

Let children collect fraction expressions found in geography and other reading.

**ADDITION OF COMMON FRACTIONS AND MIXED NUMBERS WITH LIKE OR RELATED DENOMINATORS.**

It is recommended that addition of fractions with unlike unrelated denominators be deferred to Grade 6.

**READINESS.**

Much objective work must be done to be sure that the fractions used in addition are meaningful. The knowledge that only like things can be added should have resulted from addition of whole numbers but needs attention here.

The range of types of material covered by a pretest should be such that it will go beyond the knowledge of any one child. The use of a pretest will permit the teacher to avoid spending time on phases of work known by all children. Such a test follows:

**Pretest for Addition of Fractions and Mixed Numbers with Like and with Related Denominators.**

1. One orange and five oranges are\_\_\_\_\_.
2. Two pencils and four pencils are\_\_\_\_\_.
3. One inch and three inches are\_\_\_\_\_.
4. One fifth and three fifths are\_\_\_\_\_.
5. One eighth and five eighths are\_\_\_\_\_.
6.  $\frac{3}{8}$  and  $1\frac{1}{8}$  are\_\_\_\_\_.
7. Three fourths of an orange and\_\_\_\_\_ fourth of an orange make one whole orange.

8.  $5/6$  and  $1/6 = 1$ .
9.  $2/5$  and  $3/5$  are 1.
10. Three eighths and seven eighths are \_\_\_\_\_.  
Write the sum in another way.
11. Marion's mother bought one-half yard of pink percale and three-fourths of a yard of blue. She bought \_\_\_\_\_ yards of cloth.
12.  $3/4$  and  $3/4$  are \_\_\_\_\_.
13.  $3/4$  and  $1/2$  are \_\_\_\_\_.
14. Underline the correct answer.  $6/8$  is the the same as  $1/2$ ,  $3/4$ ,  $4/5$ ,  $8/6$ .
15. Draw lines connecting numbers which have the same value.

$3/4$	$1\ 1/2$
$1\ 1/4$	$4/3$
$4/8$	$1\ 2/3$
$1\ 1/3$	$4/6$
$7/2$	$5/6$
$6/4$	$6/8$
$5/4$	$3\ 1/2$
$2/3$	$5/4$
$10/12$	$1/2$

16. Add:
- |          |          |          |          |          |
|----------|----------|----------|----------|----------|
| $2\ 1/4$ | $3\ 1/3$ | $5\ 3/4$ | $2\ 3/4$ | $1\ 2/3$ |
| $3$      | $2\ 1/3$ | $2\ 1/4$ | $3\ 3/4$ | $2\ 2/3$ |
| $1\ 1/4$ |          |          |          |          |
| <hr/>    |          |          |          |          |
|          | $3\ 1/2$ |          | $1\ 1/4$ |          |
|          | $2\ 3/4$ |          | $2\ 1/4$ |          |
|          | <hr/>    |          | $1\ 1/2$ |          |
|          |          |          | <hr/>    |          |

#### SELECTION AND ORGANIZATION OF SUBJECT MATTER.

Teaching steps will be found in all textbooks.

#### DRILL.

Much drill should be given in adding fractions mentally and giving their answers in simplest terms. This, of course, applies only to very simple work. Adults should certainly be able to add halves, thirds, fourths, eighths; halves and fourths, halves and eighths, fourths and eighths, without resorting to written computation. This result will be achieved only if children are encouraged at all times to think answers without written computations.

#### SUBTRACTION OF COMMON FRACTIONS AND MIXED NUMBERS WITH RELATED DENOMINATORS.

#### READINESS.

The concepts needed for subtraction of common fractions and mixed numbers are not

different from those needed for addition. In fact, addition and subtraction are often taught together.

#### PROCESS STEPS.

As in addition the teacher is urged to develop the process steps objectively.

#### DRILL.

There are no special drill phases other than the process steps. Of course, any mental-oral drill on subtracting fractions with related denominators such as

$$\frac{1}{2} \quad \frac{7}{8} \quad \frac{5}{8}$$

will aid in preparing children to

$$\frac{1}{4} \quad \frac{3}{4} \quad \frac{1}{2}$$

find answers without written computation.

#### EVALUATION.

The teacher will be interested to make a subtraction pretest similar to the addition pretest.

### **MULTIPLICATION OF COMMON FRACTIONS AND MIXED NUMBERS BY INTEGERS.**

#### READINESS.

The primary multiplication facts, multiplication by a one-place number, (mentally whenever possible), the primary even division facts, and division by a one or two place divisor are the skills necessary for multiplication of fractions and mixed numbers. Since all of these have been in constant use in long division there should be no question of their mastery at this point.

#### SELECTION AND ORGANIZATION OF SUBJECT MATTER.

Multiplication of fraction by integer and integer by fraction must precede the more useful step, multiplication of a mixed number and an integer.

Avoid the term "cancellation".

The widespread dissatisfaction with the term "cancellation" has arisen from the tendency of the children to cancel literally instead of dividing. Since the process which has been called cancellation is really nothing more than reducing to simplest terms before getting the answer instead of reducing the answer, the term reduction should serve here.

The use of both the word "of" and the multiplication sign will avoid confusion in meeting either form.

Be ready to correct the generalization true in integers but erroneous here, that multiplying always gives a result larger than either of the numbers multiplied.

Discuss nature of answer and check on reasonableness. Encourage mental solution by giving many examples such as  $\frac{3}{4}$  of 12,  $\frac{3}{8}$  of 16,  $\frac{2}{3}$  of 9,  $\frac{3}{5}$  of 15, etc. Encourage finding one fourth, then three fourths, instead of meaningless mechanical figuring.

Children should be taught to multiply examples as simple as  $2\frac{1}{2} \times 2$ , and  $12 \times 3\frac{1}{2}$ , mentally without changing the mixed numbers to improper fractions. Multiplying  $21 \times 16\frac{2}{3}$  in this manner

$$\begin{array}{r} 16\frac{2}{3} \\ \times 21 \\ \hline 14 \\ 126 \\ 21 \\ \hline 350 \end{array}$$

changing  $16\frac{2}{3}$  to  $\frac{50}{3}$ . In  $84 \times 16\frac{2}{3}$  this form is preferred

$$\begin{array}{r} 84 \\ 16\frac{2}{3} \\ 3 \overline{)168} \\ \hline 56 \\ 504 \\ 84 \\ \hline 1400 \end{array}$$

#### DRILL.

Perhaps the greatest emphasis in drill should be placed upon the mental multiplication of fraction and integer in examples such as  $\frac{3}{4}$  of 20,  $\frac{2}{3}$  of 12,  $\frac{1}{2}$  of 36, etc.

The teacher must be sure, as in any process, that the child knows what he is doing before he begins to practice. Leaving an example which has been worked out on the board as a sample for the children to follow if needed may serve to prevent error on the part of slower children.

#### EVALUATION.

In evaluating test results the teacher must determine whether the error occurs in new process steps being learned or in earlier facts and processes.

The teacher may wish to make short tests for different steps in multiplication. She will also wish to make one test covering all types of examples.

#### BUSINESS FORMS.

The use of receipts and bills should continue in Grade 5. See Grade 4 outline for sample forms.

The use of money orders should be taught if and when a real need arises.

#### GRAPHS.

##### The Reading of Graphs.

Instruction will take place when the need arises in interpreting graphs found in social studies and science materials. Bar and broken line graphs are most often found. However, any other types occurring will be studied as need arises.

##### The Construction of Graphs.

Graphs encouraging competition with one's own record as in individual spelling graphs, or those promoting co-operation, as in daily attendance and weekly stamp sales, are to be preferred to those stressing competition with others.



**GRADE 6: OVERVIEW CHART.****SUBJECT MATTER AREAS AND OBJECTIVES.**

AREAS OF GROWTH	MAJOR FIELDS
<p><b>JUDGMENT</b></p> <p>Comparison of numbers met in reading with familiar quantities, distances, sizes, etc.</p> <p>Estimation of linear distances, areas, volumes, weights, and liquid measure.</p> <p>Estimation of results of computation. Arrangement of decimal fractions in order of size. Placement of decimal points so as to make result reasonable.</p> <p>Reading of values in graphs.</p> <p>In problem solving, collection of data, selection of steps, reasonableness of answer.</p>	<p>NUMBER SYSTEMS</p> <hr/> <p>ADDITION, SUBTRACTION, AND MULTIPLICATION</p> <hr/> <p>DIVISION</p> <hr/> <p>COMMON FRACTIONS</p> <hr/>
<p><b>WORK HABITS</b></p> <p>Willingness to assume responsibility for accuracy.</p> <p>Confidence in ability to be accurate.</p> <p>Acceptance of challenge of new and difficult steps.</p> <p>Enjoyment in doing examples by inspection.</p> <p>Desire to be businesslike.</p> <p>Desire to see own improvement recorded.</p> <p>Enjoyment in making and solving real problems.</p>	<p>DECIMAL FRACTIONS</p> <hr/> <p>MEASUREMENT DENOMINATE NUMBERS</p> <hr/> <p>BUSINESS FORMS</p> <hr/> <p>GRAPHS</p> <hr/>
<p><b>UNDERSTANDINGS</b> See column.</p>	<p>PERCENTAGE</p> <hr/>
<p><b>SKILLS</b> See column.</p>	<p>PROBLEM SOLVING</p>



UNDERSTANDINGS	SKILLS
Adequate understanding of place-value and decimal features of the Hindu-Arabic system to make possible the understanding of the decimal fraction.	Correct reading of numbers.
Continuation from Grade 5.	Maintenance drill. Reasonable speed. Much mental computation. Checking.
Understanding in so far as possible of what is taking place in division based on experimentation and rational approach.	Two and three-place divisors when trial quotient is not true quotient.
Understanding common denominator.	Addition and subtraction of fractions with unrelated denominators. Multiplication of fractions and mixed numbers. Division. Much mental work on simple phases.
Understanding of the decimal fraction as an extension of the decimal system of integers. Concept of approximation applied to decimal fractions expressing measurements. Significance of terminal zero.	Reading and writing decimal fractions. Addition and subtraction of decimal fractions. Multiplication and division with decimal fractions. Placing points by inspection as well as by rule.
Awareness that units of measure in English system grew out of convenience and custom and have no common base. Distinctions among linear, area, volume, and dimension situations. Awareness of measuring uses in every day life.	Ability to measure. Application of measurement to Consumer Education. Memorization of relations between units in tables and subsequent use in reductions. Abbreviations. Fundamental processes with compound denominate numbers as needed.
Interpretation of bills.	Habit of giving and of expecting receipts.
Interpretation of graphs of any types occurring in reading.	Construction of bar and broken line graphs based on children's experiences.
Percentage not a new topic, but special application of decimal fraction. Interpretation of percent expressions.	Reading and writing percents. Finding a percent of a number.
Reading of problems, especially those verbal, most important.	Checking computation.

**GRADE 6: PLANNED INSTRUCTION IN SUBJECT MATTER AREAS.****UNDERSTANDING, READING, AND WRITING NUMBERS.**

## READINESS.

Observation of the children's interpretations of numerical references will show the teacher the extent of their comprehension of number. Their reading of computation results will disclose the need for elimination of the habit of using "and" in a whole number. Examination of papers will show which children need to work for better figure formation.

## SELECTION AND ORGANIZATION OF SUBJECT MATTER.

Needs for reading and comprehending numbers more frequently result from informational situations than from computational sources. Current world affairs require the average individual to read much larger numbers than heretofore. Newspapers and periodicals use billions now, whereas millions seemed large a few years ago. Cost of defense measures, the national budget, relief funds, exports and imports, etc., as printed in the news, make the recognition of large numbers an absolute necessity if one is to keep up with the times. In the study of geography, pupils must be able to read population figures, areas of states, etc.

Before the child can understand the meaning of the decimal fraction, he must comprehend the most important characteristics of the decimal system of whole numbers. The positional or place value characteristic of our system can be emphasized by devices such as (1) reading numbers, giving each place its value as in 385, which means three hundreds, eight tens, five units or ones; (2) showing that 48 and 84 differ because of the position of the digits; and (3) contrasting our system with the non-positional Roman system. The decimal feature of our number system should be emphasized by making sure that decimal is associated with the tens relation between positions in a number. This will be helpful later in teaching the decimal fraction as an extension of the decimal system of whole numbers. The significance of zero as a place holder in a positional system can be shown easily.

## DRILL.

As was pointed out in Grades 4 and 5, the reading of numbers for comprehension will be necessary in current events and other social studies. If the teacher in addition to this has computation results read by the children, she will need to give no formal drill.

## EVALUATION.

No formal test for this topic will be so effective as the teacher's daily observation of the children as they use numbers for informational and computational needs.

## ENRICHMENT.

Spitzer<sup>1</sup> suggests that the abacus be used to show place value.

"The Story of Numbers"<sup>2</sup> may prove interesting to faster working sixth grade children.

To reinforce the importance of the positional characteristic of our number system, show how awkward manipulation of Roman numerals would be: 3333 is expressed MMMCCCXXXIII.

**MAINTENANCE AND REMEDIAL PROCEDURES FOR ADDITION, SUBTRACTION, MULTIPLICATION, AND DIVISION.**

FACTS. When the drill in Grades 3, 4, and 5 has been administered to the individual on the basis of his need as determined from observation and test results, there should be few

1. Spitzer, Hubert F., *The Teaching of Arithmetic*. Boston: Houghton Mifflin Co., 1948. p. —.

2. American Council on Education, "The Story of Numbers" Washington, D. C.

children entering Grade 6 who have not achieved a close approach to mastery. Only when the teacher is willing and able to find out what facts the child does not know, and the child has listed and mastered these facts, can the teacher feel that success has been attained.

**PROCESS STEPS.** Results of process step tests for addition, subtraction, multiplication, and division with a one-place divisor, will show need for any reteaching or individual drill to correct process difficulties.

### **DIVISION WITH TWO-OR THREE-PLACE DIVISORS: TRIAL QUOTIENT NOT THE TRUE QUOTIENT.**

#### **READINESS.**

Readiness for this work necessitates mastery of all preceding work in division. For the first time the child discovers that he has to do much careful thinking and testing. Up to this time the increase-by-one rule has worked satisfactorily.

#### **SELECTION AND ORGANIZATION OF SUBJECT MATTER.**

Emphasis should be placed upon estimation of the quotient figure. The use of judgment instead of trial and error should be encouraged. Probably it is impossible to spend too much time on this one phase, estimating the quotient figure. Completing every problem is unnecessarily time consuming.

#### **DRILL.**

Now that we have found that the apparent quotient is not always the true quotient, it is desirable that the product of quotient figure and divisor be tested mentally because it may have to be rejected. Skill in multiplying a two-place by a one-place number and thinking the answer will greatly facilitate this type of division.

Sufficient drill on each step must be given so that no confusion arises in the child's mind.

#### **EVALUATION.**

Pretests for this phase of division include all cases of division with two-place divisors where the trial quotient is the true quotient, which in turn presupposes mastery of 100 primary and 175 decade addition facts, 100 primary subtraction facts, 90 or 100 primary multiplication facts, 90 primary even and 360 primary uneven division facts.

The teacher will wish to prepare tests on the different steps in this process and finally a test including examples of all types.

### **ADDITION OF COMMON FRACTIONS WITH UNRELATED DENOMINATORS.**

#### **READINESS.**

Skill in adding fractions and mixed numbers with like and with related denominators and skill in expressing answer in simplest terms or changing from improper fraction to mixed number are necessary before attempting this step.

#### **SELECTION AND ORGANIZATION OF SUBJECT MATTER.**

Addition of unlike fractions, common denominator not seen. Children will be taught that when denominators have no common factor the product of their denominators will be the common denominator. They will be taught that when the denominators have a common

factor, the common denominator may be found by trying successive multiples of the larger or largest denominator. Examples like these are infrequent in real situations and need not be given the same amount of drill as the more commonly used types.

The use of objective materials and diagrams should continue or else the work will degenerate into mere mechanical procedure.

#### DRILL.

So few real uses for this type of computation are encountered in real life that mastery is not possible without more time being devoted to drill than is warranted by use. Faster working children will become skillful in this work as will many average children, but for many slower children the learning will be temporary. If mastery of fundamental processes with integers and of addition of fractions with like and with related denominators is achieved, teachers of junior high school mathematics, being relieved of the burden of remedial work on these phases, can teach addition of fractions with unrelated denominators in a relatively short time.

Some drill in the selection of common denominators may be given prior to, or in place of, having the entire example worked out each time.

#### EVALUATION.

A test given at this time should include all other phases of addition of fractions as well as the type new to this grade.

#### ENRICHMENT.

Some of the brighter children may be interested to know that two unit fractions can be added by adding their denominators for a numerator and multiplying their denominators for a denominator; e.g.,  $1/2 + 1/3 = 5/6$ ;  $1/3 + 1/4 = 7/12$ . This will work when the denominators contain a common factor, as in  $1/4 + 1/6 = 10/24 = 5/12$ , but the result has to be expressed in simplest terms.

### **SUBTRACTION OF COMMON FRACTIONS WITH UNRELATED DENOMINATORS.**

#### READINESS.

Subtraction of fractions and mixed numbers with like and with related denominators is necessary preparation for this step.

#### SELECTION AND ORGANIZATION OF SUBJECT MATTER.

Children will be taught that when the denominators have no common factor the product of these denominators will be the common denominator. They will be taught that when denominators have a common factor, the common denominator may be reached by trying successive multiples of the larger or largest denominator.

#### DRILL.

As in addition of fractions with unrelated denominators, the infrequency of use of this step makes time spent on its mastery seem unwise. With mastery of fundamental processes with integers and of subtraction of fractions with like and with related denominators guaranteed, the time usually spent in remedial work in Junior High School can be devoted to perfecting this step.

#### EVALUATION.

A test given at this time should include all other phases of subtraction of fractions as well as the type new to this grade.

Tests will also be desirable for determining success in the two types of examples included in the work of this grade.

#### ENRICHMENT.

Brighter children may be interested in using a short method for subtracting unit fractions similar to the one suggested earlier for addition of unit fractions, viz., subtracting denominators for a numerator and multiplying denominators for a denominator, e.g.,  $1/3 - 1/4 = 1/12$ ,  $1/5 - 1/2 = 3/10$ .

### MULTIPLICATION OF COMMON FRACTIONS AND MIXED NUMBERS.

#### READINESS.

Skill in multiplying fractions and mixed numbers by integers and in changing fractions to simplest terms or mixed numbers is prerequisite for this step.

#### SELECTION AND ORGANIZATION OF SUBJECT MATTER.

The work of this grade includes the multiplication of fraction by fraction, fraction by mixed number, and mixed number by mixed number.

In work like  $1/2$  of  $2/3$  let's be sensible and encourage children to inspect the example before plunging into mechanical manipulation. From thinking one half of two oranges is one orange, one half of two miles is one mile, the transition to one half of two thirds is one third (or  $1/2$  of  $2/3$  is  $1/3$ ) is understandable.

Discovery of the denominator in the product in examples like  $1/2$  of  $1/4 = 1/8$ ,  $1/2$  of  $3/4 = 3/8$  may be made by the children through the use of the objective materials mentioned.

Children have seen from diagrams and from their own written work that dividing numerator and denominator of a fraction by the same number does not change its value. If they continue thinking this way instead of using the word "cancellation," the teacher will avoid difficulties which many times seem insurmountable. In examples like  $2/3$  of  $6/7$ , and  $2/3$  of  $9/16$ , children should be taught to divide a numerator and a denominator by the same number and to continue this process as long as possible. Such simple treatment avoids the confusion so often accompanying cancellation.

Children have, in Grade 5, been taught to multiply integer and mixed number, without changing the latter to improper fractions, by using the form

$$\begin{array}{r} 24 \\ 12\frac{2}{3} \\ \hline 16 \\ 48 \\ 24 \\ \hline 304 \end{array}$$

There are many examples in multiplication of fraction and mixed number, especially those with unit fractions, simple enough to be done by children without changing the mixed numbers to improper fractions. In  $1/2$  of  $16\frac{2}{3}$  children can be taught to think  $1/2$  of 16 and  $1/2$  of  $2/3$ . Only the more difficult examples of this type and examples with mixed number by mixed number require changing the mixed numbers to improper fractions.

#### DRILL.

Drill which includes many simple examples which can be done mentally will yield more functional results than time spent in performing more difficult computations.

**EVALUATION.**

Since the method of thinking the solution to an example is as important as the answer, the teacher will need to interview each child individually to discover his exact procedures.

Tests will also be needed to determine success in performing computation with examples of this type.

**ENRICHMENT.**

There is a tendency in some quarters to feel that in the very simple examples in multiplication of mixed numbers by mixed numbers which occur, if indeed any do ever occur, the method of cross-multiplication might be used. At least it is possible that rapid working children may be interested in it. An illustration follows:

$$\begin{array}{r}
 12\frac{1}{2} \\
 \underline{8\frac{2}{3}} \quad (\frac{2}{3} \times \frac{1}{2}) \\
 \frac{1}{3} \quad (\frac{1}{2} \times \frac{2}{3}) \\
 8 \quad (\frac{2}{3} \times 12) \\
 4 \quad (8 \times \frac{1}{2}) \\
 \underline{96} \quad (8 \times 12) \\
 108\frac{1}{3}
 \end{array}$$

The work in parenthesis is given only for explanation but would be dropped as soon as children know the process.

**DIVISION OF COMMON FRACTIONS.**

So little need has been found for division involving common fractions that it has been indicated as an optional topic.

Any teacher who feels that the children in her grade are ready for division of common fractions will wish to develop meanings carefully and to limit her work to situations requiring little manipulation.

**READINESS.**

No new computation skills beyond those employed in multiplication of common fractions are needed for division. A test covering the various steps in multiplication of fractions and mixed numbers will be helpful before beginning division. A pretest involving the relation of division to multiplication would be helpful in showing the concepts useful in division which are possessed by the children.

**SELECTION AND ORGANIZATION OF SUBJECT MATTER.**

It seems desirable to develop examples of these two types:  $\frac{3}{4} \div 2$  and  $3 \div \frac{1}{2}$ , without teaching inverting the divisor.

Through using integers divided by 2 it can be shown that dividing by 2 is the same as "taking half of." Using  $6 \div 2 = 3$  and  $\frac{1}{2} \times 6 = 3$  with many other such examples will show this. Objective demonstration dividing  $\frac{3}{4}$  of a yard on a yardstick or string  $\frac{3}{4}$  yards long by 2 will show that the result is  $\frac{1}{2}$  of  $\frac{3}{4}$ . Dividing by 2 can be followed by dividing by other integers.

When demonstrating  $3 \div \frac{1}{2}$  a string a yard long can be divided into pieces  $\frac{1}{2}$  yard in length resulting in 2 pieces. If one yard makes 2 pieces, two yards will make 4 pieces and 3 yards will make 6 pieces. From such objective illustrations it can be shown that dividing by  $\frac{1}{2}$  is the same as multiplying by 2. This can be followed with fractions whose denominators are larger than two.

In solving examples of the following types— $3 \div \frac{3}{4}$ ,  $\frac{2}{3} \div \frac{1}{2}$ ,  $\frac{2}{3} \div \frac{3}{4}$ ,  $\frac{2}{3} \div \frac{4}{5}$ ,  $2 \frac{1}{2} \div \frac{3}{4}$ —two procedures are possible. The more common teaching procedure is to tell children to invert the divisor and multiply. It is possible to rationalize this step. 3 divided by  $\frac{3}{4}$  may be thought of as asking how many pieces of cloth three-fourths of a yard long are there in 3 yards. 12 pieces  $\frac{1}{4}$  of a yard long can be made. Since pieces  $\frac{3}{4}$  of a yard long are 3 times as long as a piece  $\frac{1}{4}$  of a yard long, only  $\frac{1}{3}$  as many can be made. The rational procedure just demonstrated is that of multiplying by 4 and dividing by 3 which the children will discover is the same as multiplying by the inverted divisor.

This particular procedure is too difficult in examples like  $\frac{3}{4} \div \frac{2}{3}$ . However, a more easily understood procedure consists of changing the fractions to those with like denominators. Thus  $\frac{3}{4} \div \frac{2}{3}$  becomes  $\frac{9}{12} \div \frac{8}{12}$ . At this stage the teacher says "How many groups of 8 chairs are there in 9 chairs?" "How many groups of 8 books are there in 9 books?" etc., and finally "How many groups of  $\frac{8}{12}$  are there in  $\frac{9}{12}$ ?" This is a step toward the shorter process of inversion.

Examples like  $\frac{3}{8} \div 1\frac{1}{2}$  and  $5\frac{1}{2} \div 2\frac{1}{4}$  are handled in the same way.

#### DRILL.

Practice in thinking what fraction to use in multiplication when dividing by 2, 3, 4 and practice in thinking what integer to use in multiplication when dividing by a unit fraction such as  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{3}$  will be helpful in making the process meaningful.

Some drill may be given in telling what the example will be when made into a multiplication example without going on to complete the solution; e.g.,  $3 \div \frac{3}{4} = 3 \times \frac{4}{3}$ .

#### EVALUATION.

A pretest besides covering multiplication of common fractions may include questions to determine concepts possessed by the children relative to division. A few such questions follow:

Dividing  $\frac{3}{4}$  by 2 is the same as finding \_\_\_\_\_ of  $\frac{3}{4}$ .

How many pieces one half yard long can be cut from a yard of ribbon? \_\_\_\_\_

How many pieces  $\frac{1}{3}$  yard long can be cut from a yard of ribbon? \_\_\_\_\_

How many pieces  $\frac{1}{4}$  yard long can be cut from 2 yards of ribbon? \_\_\_\_\_

Can you cut from a roll of ribbon more or fewer pieces  $\frac{3}{4}$  of a yard long than  $\frac{1}{4}$  of a yard long? \_\_\_\_\_

When you divide  $\frac{3}{4}$  by 2, is the answer larger or smaller than  $\frac{3}{4}$ ? \_\_\_\_\_

When you divide 3 by  $\frac{1}{2}$  is the answer larger or smaller than 3? \_\_\_\_\_

### UNDERSTANDING, READING, AND WRITING DECIMAL FRACTIONS.

#### READINESS.

A real understanding of the nature of the decimal fraction as an extension of the decimal system of whole numbers depends more than anything else upon an understanding of the positional and decimal characteristics of our whole number system. This understanding is no doubt a matter of growth, but misconceptions can be avoided if the children grasp the real meaning of our number system.

Correct reading and writing of integers and of United States money with proper regard for the use of "and" is the best preparation for reading and writing decimal fractions.

The long way of reading a number, as 327 means 3 hundreds, 2 tens, and 7 units, is an important step toward the correct long way of reading a decimal fraction.

#### MEANING.

Barber<sup>1</sup> points out that the use of the terms "common fractions" and "decimal fractions" helps make clear that decimal does not mean fraction as is frequently believed by children, but is descriptive of the kind of fraction. Too often children who use the terms fractions and decimals think of them as entirely unrelated topics. They do not realize that common fractions and decimal fractions are two ways of expressing parts. Nor do they think of decimal fractions as an extension of the decimal system of whole numbers.

While the concept of the inexact nature of the decimal fraction may be too difficult for the sixth grade, the teacher must do all that she can to avoid the misconception (so common on higher levels) that an expression such as 16.3 means exactly sixteen and three tenths miles. In their measuring, prior to this time, children should have learned to think and to speak of a measurement as made to the nearest inch, nearest foot, nearest pound, etc. Although the average person will not be called upon to use a decimalized ruler in measuring, a ruler with decimal divisions of the inch and a micrometer are very useful in giving children some appreciation of the fineness of measurement.

The significance of the terminal zero in a decimal fraction is also probably not well understood at the sixth grade level. The teacher should not permit the adding and dropping of terminal zeros and will and should make clear if possible the difference between an expression such as 1.7 and 1.70. Weather reports in which the measurement of precipitation is given to hundredths always keep the two places after the point even though the second or hundredths figure is zero. The presence of the zero indicates that the gauge used is graduated to hundredths of an inch. The value 1.7 occurring in automobile mileage indicates that the odometer registers in tenths of a mile. A series of mileages might appear 2.6, 3.2, 4.0, 5.1, etc., showing the same principle as above. Since there are no occasions except in United States money where it is necessary to change expressions to the same degree of exactness, it is undesirable to teach children to add and drop zeros at will. Zeros have meaning and significance if not value in computation.

The understanding of the decimal fraction idea is so important that we are including several approaches to it. The most objective approach is through the use of a diagram which commonly appears in the form of a square divided into ten rows of ten squares each. Some teachers draw these lines with ordinary chalk on a very wet blackboard thus making a chart which is not removed by ordinary erasing. On such a chart the relative sizes of tenths and hundredths can be seen. In place of this diagram may be used a long scale made from graph paper with the smallest division representing thousandths.

Since children have learned much about United States money before becoming acquainted with the decimal fraction, a second approach is through our money system. They already can read \$1.23 and recognize the one as meaning one whole dollar, and the 23 as meaning 23 cents. Work like the following may then be done.

**Problem.** Understanding of the meaning of the figures used in various sums of money may be followed by other numbers. \$1.23, \$4.83, \$2.35; then 1.20 inches, 2.43.

**Teaching procedures.** The teacher should show a dollar bill and a handful of change, and ask the children to show her \$1.23 in as many ways as possible. Among the ways will be a one-dollar bill, two dimes, and three cents. Leave this arrangement where they can see it. How many dimes are there in one dollar? What part of a dollar is one dime? Are 2 dimes? Then what does the 2 mean? In \$4.83 what does the 8 mean? In 1.20 inches of rainfall what

1. Barber, Harry C. "Teaching Junior High School Mathematics." Houghton Mifflin 1924, p. 26.



does the 2 mean? In 2.43 what does the 4 mean? What does the figure at the right of the point always mean? Why is the point there? What do we find at its left? At its right?

How many cents in \$1.00? What part of one dollar is one cent? Are two cents? 8 cents? 14 cents? Then what part of one dollar is our 3 cents? In \$4.83 what does the 3 mean? In \$1.06 what does the 6 mean? In 2.34 what does the 4 mean? What does the second figure at the right of the point always mean?

The children may read several numbers in both the long and the short way: 24.56 means 2 tens, 4 ones, 5 tenths, 6 hundredths or 24 and 56 hundredths. 245.07 means 2 hundreds, 4 tens, 5 ones, no tenths, 7 hundredths or 245 and 7 hundredths.

A third approach is through common fractions. In what way do we usually write two tenths?  $\frac{(2)}{(10)}$  three hundredths?  $\frac{(3)}{(100)}$

When we write \$1.23 what does the two mean? the three? Then what does this show you about two ways of writing tenths and hundredths? Two tenths, written  $\frac{2}{10}$ , is called a common fraction; two tenths, written .2, is called a decimal fraction. I wonder what you would called the point. Why did you choose this name?

A fourth approach is through the decimal system of whole numbers. Using the number 1,111 the child recalls that each position to the left has 10 times the value of the preceding position (the decimal feature of our number system). Reversing the direction means that each position has a value  $\frac{1}{10}$  that of the position to its left. Since one is the smallest possible whole number, a period called a decimal point is placed after it to separate the integral from the fractional part which is to follow. The next position being  $\frac{1}{10}$  of 1 is named tenths, the following position being  $\frac{1}{10}$  of  $\frac{1}{10}$  is named hundredths and so on. The child will discover that the value of each position as one progresses from right to left is multiplied by 10, whether in a whole number, a decimal fraction, or a number containing both an integral and a fractional part. Through this fourth approach the decimal fraction is seen to be an extension of the decimal system of whole numbers. Instead of the selection of one of these approaches, the use of all will lead to a broader understanding of the decimal fraction.

### Thoughts to Stress in Decimal Fractions.

1. Through the development of the meaning of the decimal fraction children must be led to understand that the number of digits in a decimal fraction is not an indication of the size or value of the fraction; e.g., the fraction .9 is larger than .898.

2. Children must be led to see that common fractions and decimal fractions, both of which are ways of expressing parts, are being used side by side in our present civilization. Custom has established for each type of expression certain uses which are fairly constant. List with the children uses for decimal fractions and for common fractions noting exceptions to custom. In the common fraction both numerator and denominator have been expressed.

3. In decimal fractions the numerator is expressed and the denominator is indicated by the number of digits in the numerator.

4. Zeros before the significant figures are place holders; e.g., in .05 and .005 each numerator is 5.

5. The denominator of a decimal fraction is ten or a power of ten.

6. Changes from decimal fractions to common fractions are commonly made when the decimal fraction is recognized to have a common fraction equivalent with which it is easier to compute. This is especially true when those decimal fractions occur in the form of per

cents. Unless the equivalent is readily recognized or the common fraction is easier to use there is no point in expressing decimal fractions as common fractions. If a list of equivalents including  $.5 = 1/2$ ,  $.33 = 1/3$ ,  $.25 = 1/4$ ,  $.75 = 3/4$ ,  $.2 = 1/5$ ,  $.4 = 2/5$ ,  $.6 = 3/5$ ,  $.8 = 4/5$ , is posted many children will become familiar with them.

7. Expressing common fractions as decimal fractions is a common procedure in any percentage application when finding the percent one number is of another. This process pre-supposes skill in division with decimal fractions and will be treated as a part of the division process. Neither time nor frequency of use warrants attempting mastery of this process. Any needs which arise in Units can be cared for at the time.

8. As has been mentioned in the discussion of whole numbers "and" should be read only between the whole number and the fraction whether common or decimal. "And" is not read between periods or between digits in a whole number. Practice in reading decimal fractions should not be limited to reading abstract numbers giving the correct denominator value but should make use of concrete materials following the reading being followed with interpretation. Some suggestions for such materials are railroad timetables, automobile guide books, weather reports, automobile odometer, advertisements of sale of house lots specifying dimensions, advertisements of automobile tires, etc.

9. Reading of integers and decimal fractions in both the long and the short form is of inestimable value to the child in his attempt to grasp their meaning.

10. The rapidly increasing use of decimal fractions in daily living makes a thorough understanding especially necessary.

#### ENRICHMENT.

A collection of newspaper clippings including decimal fractions found in advertisements and in news items, time tables and references to decimal fractions in books is a valuable part of the teacher's equipment. Charts may be made by mounting the decimal fraction illustrations brought in by the children. Rug sizes, which are not decimal in meaning (9.6 means 9 feet 6 inches) and time expressions written with a period (as 6.20) will be brought in by the children and must be classified as non-decimal uses of the period.

#### DRILL.

##### **Reading decimal fractions.**

In reading decimal fractions children should be taught to observe this procedure: Read the whole number as if it stood alone, read the decimal point as "and", read the fraction as if it were a whole number then give it the place name of the right hand figure.

##### **Writing decimal fractions.**

Children should be encouraged to think "How many places are needed for hundredths (or thousandths)? How many places in the given number? How many zeros are needed? Then how will they write the fraction (beginning with the point)?"

Arrange decimal fractions in order of size. Change decimal fractions to common fractions and vice versa. Place points in numbers so as to make the content reasonable.

#### EVALUATION.

Although the observation made by the teacher is the best guide to the introduction of decimal fractions there may be teachers who wish to give some kind of written pretest. Some suggestive questions for a test are the following.

1. If you open your Penny Bank and find \$1.23 how many pennies are there?
2. How many dimes in one dollar?
3. What part of one dollar is a dime?

4. What part of a dime is one cent?
5. In early times both tobacco and animal skins were used as money. Why is our money better?
6. Write the following with the dollar sign:
 

25 cents	10 cents	5 cents	1 dollar
2 dollars	40 cents	1 dollar	35 cents
1 dollar	3 cents	1 dime	2 dimes and 1 nickel
7. In \$12.34 what does the 1 mean? the 2? the 3? the 4?
8. John has \$2.37 and spent \$1.89. How much money has he left?
9. John earned 30 cents an hour for 4 hours each Saturday morning. How much will he earn in 4 Saturdays?
10. Which represents the most money: \$ .09, \$ .95, \$ .99, \$ .089?
11. Which is the largest number: 1.23, 1.35, 1.89, 1.29, 1.2?
12. Arrange these in order of size (the largest first): .98, .981, 1.2, .982.

## ADDITION AND SUBTRACTION OF DECIMAL FRACTIONS.

### READINESS.

Readiness for addition and subtraction of decimal fractions depends upon skill in writing correctly whole numbers to be added and subtracted; skill in writing United States money; and skill in adding and subtracting whole numbers.

### SELECTION AND ORGANIZATION OF SUBJECT MATTER

Addition and subtraction of decimal fractions or mixed numbers. Since the tendency in measuring is to use the same precision in measurements to be added or subtracted, there is no special justification for examples containing the so-called "ragged-right-hand edge." Such examples can be avoided or, if used because of their presence in pupil texts, can be rounded off to the least accurate value. If an example like this occurs, numbers can be rounded off

3.92	3.9	to tenths, the least accurate measurement.
<u>5.825</u>	<u>5.9</u>	

Continued use of the already learned rule for keeping straight columns (i.e., units under units, tens under tens, etc., should be emphasized here for those who are careless in observing it.

### DRILL.

Drill should be given in rounding off numbers to "tenths," "nearest tenths," "hundredths," "nearest hundredth," etc. The customary rule is to increase the given digit where the following one is 5 or more and to ignore the following digit where it is less than 5; e.g., 7.86 to the nearest tenth is 7.9, but 7.83 becomes 7.8.

### EVALUATION.

A subject matter pretest containing examples in addition and subtraction with integers and with United States money will indicate readiness for these processes. Following the teaching of addition and subtraction of decimal fractions tests will be given to measure the child's success in learning these.

## MULTIPLICATION OF DECIMAL FRACTIONS.

Outside of simple work with United States money very little use arises for multiplication by decimal fractions other than those which involve finding percents of numbers. This process

can be taught with more meaning when the need for such computation grows out of real uses for percentages.

#### READINESS.

Skill in multiplying whole numbers and United States money is a requisite for multiplication involving decimal fractions. Skill in determining the number of digits in the result when multiplying whole numbers (e.g.,  $42 \times 39$  must have four digits because  $40 \times 40$  equals 1600), is also necessary. The habit of thinking the nearest multiple of ten when estimating, as shown here, is desirable. Other habits of rounding off given numbers to values permitting mental computation will promote checking the reasonableness of results and placing the decimal point without use of a rule.

#### DEVELOPING THE RULE FOR PLACING THE DECIMAL POINT IN THE PRODUCT.

Children have already learned to multiply dollar and cent expressions by an integer in their work with multiplication of whole numbers. The task at this time is, therefore, that of multiplying when both factors are or contain decimal fractions.

One may teach the rule for placing the point by changing the decimal fractions to common fractions, multiplying these fractions without changing the answer to lowest terms, writing the answers in decimal fraction form and, if preferred, erasing the common fraction computation so that only factors and product remain. An illustration of this procedure follows:

$$\begin{array}{l} .3 \times .4 \quad 3/10 \times 4/10 \quad 12/100 \quad .12 \\ 3 \times .13 \quad 3/10 \times 13/100 \quad 39/1000 \quad .039. \end{array}$$

When common fraction computation has been erased the examples stand

$$\begin{array}{l} .3 \times .4 \quad .12 \\ .3 \times .13 \quad .039 \end{array}$$

From numerous examples done in this way children will be led to see that the answer is the numerical product of the factors and that there are as many decimal places in the product as the sum of the number of places in the multiplicand and multiplier.

#### DEVELOPING AN INSPECTION METHOD FOR PLACING THE DECIMAL POINT.

Some teachers favor a plan whereby the child is made independent of the rule and uses the size of the numbers being multiplied as a guide in placing the decimal point. Barber describes as follows a plan used in a sixth grade: "The first sets of exercises used for this purpose should involve such cases as  $4.26 \times 3.89$ , and  $5.29 \times 81.5$ , in which the pupil can mentally round off the numbers with ease and forecast the results. In multiplying 63.2 by 88.7 he thinks 60 times 90 quickly in his head; he should form the habit of thinking  $6 \times 9$  and annexing two zeros, getting fifty-four hundred. This method of speaking of four figure numbers as hundreds, as is commonly done outside of school, is quite helpful to the mind in grasping the real size of the number. The next case may require the multiplication of 72.6 by .518. Here the pupil thinks 70 times one-half or one-half of 70. In multiplying 432 by .317 he may say one-third of 400, or he may say one-tenth of 400 is 40, and three-tenths of 400 is 120. Multiplication by hundredths, which is important when per cent is undertaken, is easily handled in the same way:  $832 \times .041$  leads him to think that one hundredth of 800 is 8, and four hundredths of it are 32."<sup>1</sup>

#### DRILL.

Much mental oral drill in estimating products of two or three place multiplicands and two place multipliers, both of which are integers, should be given before developing any rule or

1. Barber, Harry C., "Teaching Junior High School Mathematics", Houghton Mifflin 1924, p. 29.

general procedure. This can be done by having children give first two digits of result with correct place value (e.g.  $84 \times 32$  is around 24 hundred) or by having the correct answer selected, as a. 268, b. 2688, c. 26888.

For drill in placing decimal points many exercises should be given for which the numerical product, worked out in advance, accompanies the example. Then the drill time can be spent in placing decimal points instead of in multiplication. In this way much more drill in placing decimal points will result. This type of drill is valuable whether decimal points are being placed by rule or by inspection.

## EVALUATION.

The test for multiplication process steps in the Grade 4 outline may be used to see if multiplication facts and process steps have been mastered.

Tests similar to the drill work described above may be used before and during the teaching of the placing of points in the product.

Before leaving this work the teacher will wish to give a test covering different types of examples in which the child must decide where to place the decimal point. This test should include some examples in which the multiplication must be performed and others in which the numerical answer is given and only the placing of the point is necessary. If the rule has been taught and estimating the position of the point has been given for checking purposes, some examples should be given in which the numerical answer has been rounded off so that the rule does not work and children knowing this must rely on the estimating procedure.

## DIVISION INVOLVING DECIMAL FRACTIONS.

### DIVISION OF DECIMAL FRACTION BY INTEGER.

$$\frac{5}{10} \div 5 = .1$$

$$\frac{84}{100} \div 4 = \frac{21}{100} = .21$$

$$\frac{25}{100} \div 5 = \frac{25}{500} = \frac{.5}{100} = .05$$

These results can be obtained by inverting the divisor and multiplying or, more directly and meaningfully, by dividing numerator of fraction by integer. In either case the form given below is simpler.

$$\frac{5}{10} = .5$$

$$\frac{84}{100} = .84$$

$$\frac{25}{100} = .25$$

$$\begin{array}{r} .1 \\ 5 \overline{) .5} \end{array}$$

$$\begin{array}{r} .21 \\ 4 \overline{) .84} \end{array}$$

$$\begin{array}{r} .05 \\ 5 \overline{) .25} \end{array}$$

These results are the ones given above. Can we formulate a rule applying to these and then see if it works in more cases? The children finally arrive at something like this, "Place a point in the quotient directly over the point in the dividend. Divide as in division of integers."

### DIVISION BY A DECIMAL FRACTION.

Division by a decimal fraction has for many years been taught through the process of changing the divisor to an integer and following the procedure developed above. The child is asked if he could do such an example as  $.5)625$  if the  $.5$  were the whole number 5. He knows that  $.5$  multiplied by 10 becomes 5. In developing this the teacher stresses the multiplying of the 5 by ten, not merely the moving of the decimal point. The divisor and dividend of a simple example such as  $2)6$  may be multiplied by the same number using numerous illustrations, (e.g.,  $4)12$ ,  $20)60$ ,  $6)18$ ,  $200)600$ ) so that the children may discover that the

quotient remains the same. Some teachers write the original example  $\frac{6.25}{.5}$  in common fraction form and multiply numerator and denominator by the same number. Now the child is ready to see that if he multiplies the divisor .5 by ten he must multiply the dividend 6.25 by ten. The new values may at first be written below the original example, thus  $.5 \overline{)6.25}$

$$\begin{array}{r} .5 \overline{)6.25} \\ \underline{5} \phantom{00} \\ 12 \phantom{00} \\ \underline{10} \phantom{00} \\ 20 \phantom{00} \\ \underline{20} \phantom{00} \\ 00 \phantom{00} \end{array}$$

After enough work of this kind has been done to insure understanding, it is well to see how the example can be done without rewriting... Textbooks vary in their use of the caret. Some use it in place of the original decimal point while other use it to denote the position of the point after moving it. The latter use preserves the example as given, using the caret as an aid.

There has been some discussion recently of teaching the placing of the points in examples such as the above by comparing the number of decimal places in the dividend and divisor. This method, used in earlier years, was more or less discarded in favor of making the divisor a whole number, because teachers, failing to make use of the underlying generalization that division is the reverse of multiplication, found it difficult to teach.

#### DRILL.

Sets of examples in which the figures of the quotient are given and the decimal points must be supplied will permit the child to spend his time in placing points instead of in computation.

#### EVALUATION.

Tests will follow drill suggestions above.

#### PERCENTAGE.

Percentage should be studied immediately after decimal fractions, and should be taught, not as an entirely new process, but as an elaboration in the use of one of the easiest decimal fractions, the hundredth. The task of developing this subject will be facilitated by the fact that the children will already be superficially acquainted with the concept through having seen it used in social studies and science as well as in magazines and newspapers. In some instances the children will have heard it mentioned at home and will be interested in further acquaintance with this term so often used in business. This interest will lead to an explanation by the teacher of the meaning of percentage and per cent and the learning by the children of the fractional equivalents most frequently used such as 10%, 25%, 33 $\frac{1}{3}$ %. It will also lead to the understanding of such expressions as 120%, 125%, 200%. Children readily see that per cent is a simple way of expressing an idea and will enjoy using it when possible. All these things lead to the solving of problems encountered in various activities, made up by the teacher and by the pupils, and those used by the authors of the most up-to-date texts.

The use of the term Case 1 seems both unnecessary and unwise though of course the step, the finding of a per cent of a number, is the only type of percentage problem taught in Grade 6.

#### GENERAL BIBLIOGRAPHY.

- Brueckner, Leo J. and Grossmikle, Foster E., HOW TO MAKE ARITHMETIC MEANINGFUL, New York: John C. Winston Company, 1947.
- Buckingham, B. R. ELEMENTARY ARITHMETIC: ITS MEANING AND PRACTICE. Boston: Ginn and Company, 1947.

- Chicago Public Schools, Department of Elementary Education, ARITHMETIC TEACHING TECHNIQUES, Board of Education, City of Chicago, 1949.
- University of Chicago Press, ARITHMETIC 1947, ARITHMETIC 1948, ARITHMETIC 1949, SUPPLEMENTARY EDUCATIONAL MONOGRAPH No. 63. Chicago 37: University of Chicago Press.
- Morton, Robert L. TEACHING ARITHMETIC IN THE ELEMENTARY SCHOOL, Vol. 2, INTERMEDIATE GRADES, New York, Silver, Burdett and Company, 1937.
- National Council of Teachers of Mathematics, THE TEACHING OF ARITHMETIC. Tenth Yearbook. New York: Teachers College, Columbia University, 1936.
- National Council of Teachers of Mathematics, ARITHMETIC IN GENERAL EDUCATION. Sixteenth Yearbook. New York: Teachers College, Columbia University, 1941.
- Spitzer, Herbert F., THE TEACHING OF ARITHMETIC. Boston: Houghton Mifflin Company, 1948.
- Wheat, Harry G., THE PSYCHOLOGY AND TEACHING OF ARITHMETIC. Boston: D. C. Heath and Company, 1937.
- Wilson, G. M., Stone, M. B., and Dalrymple, C. O., TEACHING THE NEW ARITHMETIC. New York: McGraw Hill Company, 1939.

**CHAPTER X****ART EDUCATION**

	Page
<b>Introduction</b> . . . . .	124
Purpose.	
Philosophy.	
Teacher Attitude.	
Classroom Environment.	
 <b>Overview</b> . . . . .	 126
Overview for Intermediate Grades.	
Overview Chart.	
Areas of Growth.	
Major Fields of Expression.	
 <b>Material by Grades</b> . . . . .	 135
Grade Expectancy.	
Some Means of Cultivating Art Growth.	
Unified Teaching.	
Grade 4. Unit: Early New England.	
Grade 5. Unit: Modelling.	
Grade 6. Unit: Embroidering and Woodworking.	
Contests and Competitions.	
Standards for Measuring Art Development.	
Summary.	
 <b>Bibliography</b> . . . . .	 140

**INTRODUCTION.**

**PURPOSE.** To establish recognition of the fact that art is a natural part of complete living at every level of experience; to foster art of the people, thus raising the cultural level both of the average person and of those who will specialize in art.

To provide first hand experiences with as many art media as possible; to foster pleasure in gaining individual control of these as they express ideas and feelings; to develop awareness and enjoyment of esthetic qualities, and an understanding of life from a cultural point of view.

To create a balance between independent and co-operative thinking and doing; to solve problems in visual terms; to see relationships—to find things that are alike or different; to perceive, not merely to see; to deal with ideas, not merely things; to think, feel, and work through a problem, and to develop art judgment.



PHILOSOPHY. Art as an essential part of education contributes to the full development of each child and to the community in which he lives. It is an interpretation of life, and must be as creative as life itself.

Art is man's expression—what he makes. Nature and science should not be confused with art. Nature is not the standard for judging art.

ART EDUCATION IS CONCERNED WITH THE INDIVIDUAL RESPONSE OF THE CHILD TO HIS ENVIRONMENT EXPRESSED THROUGH LINE, DARK AND LIGHT, COLOR, FORM, AND TEXTURE.

IT IS NOT THE DICTATING OF A TEACHER'S PRECONCEIVED ISOLATED PROBLEM, PATTERN, OR IMITATIVE DRAWING, NOR IS IT THE ALTERING BY ANOTHER OF THE CHILD'S CREATION, NOR THE IMITATING OF NATURE.

Copying has no more place in art than it has in the writing of compositions.

Few children in our elementary schools will ever be professional artists, but every child has potential powers of esthetic enjoyment and creative expression. Creative power and a sense of design are native to all people in varying degrees and grow with use. Therefore, art education is for all.

Every child is entitled to the expression of his own ideas, as he sees them.

EMPHASIS. Art as subject matter must be secondary to art as an aid to the child's full growth.

Expression of ideas and fearless experimentation with materials are more important than concern with techniques and skills.

The danger of children getting a vocabulary of given forms is that it prevents growth. Change is gained only when the original form is personally created.

To be told step by step just what to do, to draw exactly what forty other children are attempting to draw at the same time and in the same way, requires little thought and feeling. The whole process is mechanical, lacking in any value from the point of view of art. It is the teacher, rather than the children, who derives the real benefit from dictated work, for she plans it and in the planning has all the real experience that there is in it. (Tannahill)<sup>1</sup>

Art activities offer opportunities for independent thinking, making wise choices, inventing, carrying out ideas, accepting responsibility, and working with others. These activities grow out of the needs and interests of children. They may be the result of interests or needs concerned with themselves, their community, or with this part of the world.

TEACHER ATTITUDE. The teacher's part in these activities should be that of a guide rather than that of a dictator. At this age level children naturally become more critical in a photographic way, and therefore need encouragement and appreciation to continue their individual expressions. Gradually, with the help of the other children and the teacher, growth and development in art understandings are gained.

What the pupil used instinctively as a little child now very gradually becomes his consciously, and he uses these art understandings more and more effectively if they are not forced upon him.

Understanding, tolerance, and flexibility on the part of the teacher are of primary importance. She must learn to accept and appreciate the contributions of each child at his level and provide for the participation and growth of every pupil. She must recognize the danger of the exploitation of a chosen few. She must beware of establishing those conditions which foster the development of undesirable inhibitions. She must be willing to provide opportunity for the children to use and care for a great variety of media including native materials.

<sup>1</sup> S. D. Tannahill, *Fine Arts for Public School Administrators* (Bureau of Publications, Columbia Univ., N. Y. 1932) p. 3.

The teacher must recognize her key position as guide and creator of an atmosphere conducive to child initiative, participation, and growth.

Children grow through being their own critics; therefore, opportunities for evaluation are helpful and necessary. The teacher herself should make every effort to understand and be able to recognize sound design, so that she may be a constructive and wise counselor.

**CLASSROOM ENVIRONMENT.** The physical set-up of a room is a dominant factor—a silent teacher. Every schoolroom can be made and kept attractive by (1) the wise use of color and rest spaces for the eye; (2) functional arrangement of the furniture according to the pattern of the day; and (3) freedom from clutter, and from formal balance. The art materials can be organized and kept in sight for inspiration and ready use.

Sepia prints are not suitable for the decoration of elementary schoolrooms. They give a false impression of the original, and they are not enjoyed by children. Old frames can often be rubbed down and used for well chosen, colorful reproductions, or for the children's own work.

The display of commercial decorations is to be discouraged.

There should be no copied seasonal drawings on the blackboards. Any chalk drawings or paintings should be created by the children.

## **OVERVIEW OF ART FOR THE INTERMEDIATE GRADES.**

The objectives of art education for children should not be broken down into grade allotments. Art Education should guide the continuous growth of children in art understanding and expression; individual and group progress will take place if stimulation, opportunity, and wise guidance are given. The suggestions which follow indicate the major fields of desirable growth throughout the intermediate grades.

**EXPERIMENTING.** Manipulating of material to feel its possibilities and limitations. Trying colors and textures in order to discover which will best suit a definite purpose. Seeing what can be done with line and form.

**SELECTING.** Growing in the ability to make wise choices. Helping to share responsibility for choosing.

**ARRANGING AND CONSTRUCTION.** 1. Sometimes the arranging or placing is needed separately as a complete function in itself; 2. at other times the arranging or planning may need to be done before the construction takes place; and, 3. often the arranging or designing will be done directly as the child builds in either 2 or 3 dimensions.

**EVALUATION AND APPRECIATING.** Focusing attention on the improvement in the work of an individual or a group, not on individual ability. Agreeing on certain aims and goals, in order to help pupils and teacher as they discuss the work together.

Learning to recognize the kind of help one may offer, and the kind that one should refuse to accept, during an art experience.

Developing a sense of values with regard to design.

Realizing the enjoyment obtained from **looking** at things with significant art quality.

## OVERVIEW CHART.

"Because of the **wholeness** of artistic activity—because the entire personality comes into play, artistic activity is art itself. It is not something possessed by a few persons and setting them apart from the rest of mankind but it is the normal or natural human heritage. Persons differ greatly in their respective measures . . . Artistic activity is the way in which one 'may gain in the strength and stature, the belief in his own powers and the self respect which make artistic activity constructive in the growth of personality'."

John Dewey

AREAS OF GROWTH.	MAJOR FIELDS OF CREATIVE EXPRESSION.	GRADE EXPECTANCY.	SOME MEANS OF CULTIVATING.
To break down this growth into areas is difficult and more or less arbitrary. As a matter of convenience the areas have been designated as follows.	EXPERIMENTATION AND SELECTION	Each child is able and is expected to enjoy and contribute at his level of ability.	Through creating a democratic atmosphere.
ESTHETIC EMOTIONAL	ARRANGEMENT AND CONSTRUCTION	Because art is the individual expression of his awareness and ability in the major art fields, the work of each child reflects his progress regardless of grade or age level.	Through providing an attractive physical environment - light, space, color, and functional equipment and adequate supplies.
INTELLECTUAL	EVALUATION AND APPRECIATION	When experiences are rich and opportunity for art expression adequate, growth will be consistent with the general development of each child.	Through providing many varied worthwhile life experiences for the child alone or with a group.
MOTOR			Through access to a variety of art media.
SOCIAL	COLOR - is light, or the effect of light on pigment, which causes sensations in the beholder. It has power.		Through acquainting parents, administrators, and other adults with the value of art in the life of a child and helping them to understand children's work, based on design qualities and expressions of ideas and feelings rather than representative copying.
	LINE - is a mark which can indicate direction or contour.		
	TEXTURE - is the surface "feel" of anything to the eye or hand.		

## AREAS OF GROWTH.

Art activities develop out of and with the child's expanding experiences and understanding of his environment; therefore, the program should be flexible to provide for individual progress in the following areas: ESTHETIC, including both the emotional and intellectual reactions, MOTOR, and SOCIAL. The growth in these areas may occur simultaneously with the predominance of any one.

**ESTHETIC.** That which started to develop in the primary grades as sensitivity, increases in children in grades IV, V, and VI, and care should be taken to allow for and to foster their growing warmth of feeling. Encouragement for a child to express what he feels without the necessity of an explanation is essential. Courage to express his moods and his imaginative ideas should be quietly approved, so that he may gain satisfaction by objectifying them.

He naturally responds to sensations aroused through experiences vital to him. If he goes to the zoo, he may be moved by the beauty of the giraffe, the power of the monkey. If emotional reactions to these sensations are expressed, they may vary from beautiful, grotesque, humorous, to positively unpleasant, but will be emotionally sincere and therefore be a release of emotional tension, or simply a joy to the child.

When an idea begins to crystalize, a child often desires to start suddenly and work with little thought until the first forms are found or the first colors spread. Then often comes a slowing down from the early stimulation. Some thought is necessary as the problem advances. Emotional reaction to the idea is gradually becoming balanced with conscious reasoning. Although many children instinctively select and design with unerring good taste, there should be growth in conscious discrimination as the child advances.

A child will gain much understanding of a culture by seeing and touching real pieces of pottery, weaving, jewelry, and woodwork, as well as by seeing drawings, paintings, sculpture, and pictures of architecture.

This is one of the periods of transition between the unconscious acceptance of everything colorful and symbolic in early childhood, to the stage of critical judgment in adulthood. Therefore, careful balance is needed between the emotional and the intellectual so that basic art understanding may be gradually established. This will help to ensure a continuation of creative expression and serve as preparation for sound consumer ability in future years.

**MOTOR.** Esthetic values are more important than techniques and therefore should receive more emphasis. Children are eager to explore new materials and enjoy new experience as well as relive adventures. This eagerness can be expressed constructively through intelligently guided experiences with a variety of materials.

The teacher should allow full play of the child's own ideas by accepting his symbolic concepts without imposing adult standards of the "right" way something should look. Her responsibility is to offer an abundant background and to offer opportunity for the child's interpretation.

She can inspire by intelligent questions and discussion of possibilities rather than by dictation or imposition of patterns or pictures. In this way she will keep the child's eagerness and spontaneity of expression sincere and free. She should not set tasks for children that are too hard for their ability, nor so judge their accomplishment that they may develop a sense of inadequacy.

As motor co-ordination increases, the children will be ready to leave the large crude types of building which satisfied them in the primary grades, and wish to try something on a smaller scale. In another class an interest in block printing might arise, requiring the use of small tools. At this time the attention of the workers will often need to be directed to the

over-all arrangement or design. Concentration on detail, and concern for good technique are not important at this stage. Skill may be gained with practice in later years.

Likewise in painting, especially if a small brush is available, some of the children may resort to the adding of many details on small size figures and buildings. There is no harm in working on a small scale if the activity calls for it, but frustrations and inhibitions often begin at this age level; therefore some motor stimulation, such as rhythmic body movements just before they begin to paint, may help to overcome this tendency.

**SOCIAL.** As a result of being imbued with the desire to tell someone else about his ideas, a child uses art as a language. At first he may stumble on this means of communication when words seem to fail as he is describing something and he resorts to a simple diagram or rough sketch. Later as he becomes aware of the advantage of visual description, he may have quite a flare for its use. He may also become interested in reading other people's messages through their art.

There are social implications in group contacts of many kinds, such as mixing paint together, sharing materials on a service desk, discussing each others' designs, working out a paper sculpture mural with the other pupils in the class. Respect for and appreciation of the contributions of others, responsibility to the group for the performance of one's own task, and co-operation in the planning and in the use of materials are all fostered through these art activities.

### **MAJOR FIELDS OF EXPRESSION.**

The many and varied activities of art expression are here grouped into four major fields: EXPERIMENTATION, SELECTION, ARRANGEMENT AND CONSTRUCTION, and EVALUATION AND APPRECIATION. Each field can be complete in itself or can be a stage in a creative process.

Permeating these fields, and determining the value and meaning in everything the child makes, are the relationships of the elements of art:

**COLOR** — light or effect of light on pigment which causes sensation in the beholder.

**FORM** — the shape or structure of anything.

**LINE** — a mark which can indicate direction or contour.

**TEXTURE** — the surface "feel" of anything to the eye or hand.

Pupils should develop a growing awareness of these, learn to enjoy, to use, and to appreciate them wherever he finds them in life. These elements overlap and react with each other just as the major fields overlap because the creative art activity is a unifying experience through which everything is brought to an harmonious whole.

**EXPERIMENTATION** is becoming acquainted with materials and tools to discover their possibilities and limitations, either to prepare for the working out of an idea or as a means of getting an idea. It is seeing what the material can do and what the child can do with the material. It is a process of manipulation; a getting-acquainted with the material, its feel, its pliability, its visual appeal.

Each material has its own nature which is waiting to be discovered and explored. This imposes a certain discipline upon the child which he must recognize and with which he must work in order to obtain satisfaction.

All materials can be used for exploring in the field of art expression so long as they are used with reference to the art elements; that is, are chosen for their color, their form, line, or texture. Because of this, teachers can make wise use of odds and ends which children bring to school or even encourage them to collect pieces of colored yarn, cloth, wire, bits of metal, plastics, and many others.

Classrooms should be supplied with such general equipment as rulers, scissors, and paste; and several kinds of paper in varied sizes should be available to the pupils when they need to try out an idea. In addition, the following materials and tools are desirable:

Paint: jars of tempera or poster color, individual water color boxes, varied sizes of brushes,—about 12 of each kind to a class.

Crayons, pencils, charcoal, chalk, and lettering pens.

India ink, water-soluble printing ink.

Clay and plasticine. A covered crock or galvanized pail in which to keep clay moist.

Wood scraps, some softwood boards, dowels, etc. Hammers, chisel, plane, brace with bit (to fit dowel size), screw driver, cutting pliers. Try square, nails and screws, wood files, and sandpaper.

Wallpaper paste for papier-mache, newspapers.

Colored paper: both construction and poster paper in varied sizes and colors.

Cardboard: light and heavy oak tag, bristol board, chip board, and corrugated boxes.

Experimentation not only deals with materials, but should precede the selecting and arranging in any art expression.

SELECTION is the expression of personal preference. The quality of preference improves as esthetic understanding increases. The child uses his ability to make choices in relation to his need and the materials available.

In every activity or experience the child should be given opportunity to make some selection. It may be the size and color of his paper to fit his idea that he will choose, or the material that will best carry out that idea, such as watercolor or colored paper. He should be given opportunity occasionally to choose his own subject matter.

The pupil's appreciation is increased by taking the responsibility for his choices, and testing them through use, over a period of time. Sometimes there should be committee or class selections made when choosing something of a more or less permanent nature, such as helping to choose the color for the new bulletin boards. At other times individuals or committees may select a vase for flowers or the place for an exhibit.

ARRANGEMENT or CONSTRUCTION is the placing or building with selected art elements, objects, or materials according to a felt awareness of their relationship. This is design. This placement may be intuitive or gained through learned experience. It may be flat, or two dimensional; or may have bulk and be in three dimensions. Children may arrange furniture for the day's activities, books and flowers on a table, material on their written papers, letters on a booklet cover, spots of paint in a painting, threads to form a woven mat, pieces of wood to form a sledge, bits of wire to form a cage, or pieces of clay to form a group of figures. These are all arrangements of art elements; groupings of colors, forms, lines and textures. Typical activities in ARRANGEMENT are

#### **Bulletin Boards, Exhibits and Displays.**

The children should handle the arrangement of the bulletin board as a problem in design, fitting the material to the shape of the rectangle, directing the eye of the observer by grouping in relation to the main point of interest set off by rest spaces. Captions should be clearly lettered, should interpret the material, and form part of the design. Bulletin Boards may be arranged with reference to the appearance of the various items or may be influenced by the factual information in the items. Exhibits and displays present challenging opportunities to arrange for color attraction, group relationships, and areas of interest, with leading lines or color going from one to another. Displays on tables have more variety when they are on different levels. These can be made by turning boxes upside down or using blocks. Contrast of color and texture can be secured in many ways by using colored paper, wire mesh, or cardboard panels. These stimulate interest for the observer to stop and look.

**Lettering** starts as a problem in line for the formation of the letters which are derived from straight lines and curves; then it becomes a problem in color because of the tones formed by the grouping of letters to form words. The spacing of letters in a word should be judged by eye measurement rather than with mechanically measured spaces because letters vary in shape; some are closed, some are open, and some part of each. Closed letters need more space between them than open letters which have space within their formation (such as "o"). Letter arrangement or design consists in organizing the spaces between the letters, the spaces between groups of letters, and the spaces between lines of letters in relationship to the tones formed by the letters themselves. Letters can also be designed to express some characteristics called for by the problem such as making them bold or weak looking to express "power" or "fear". Letters can be drawn, painted, cut, or made with a round nib or flat nib pen. Children should practice with pens to get the feel of them and learn how the pen forms the letters. For legibility, letters of heavy strokes (and nearly square proportions) should be used with considerable contrast of value between letters and background.

**Posters** are problems in arranging letters and symbols into an attention-getting, easily read message. The representation of the idea as a symbol or designed unit and the words of the message should be unified into an organization to give dominance to either the words or the symbol and attention to the message. Posters should sell an idea, and do it quickly and attractively. The whole poster, words and units, should be roughly planned at one time before the big final one is started. This is called a "layout". Several layouts could be made with different arrangements and the most suitable could be selected for finishing. Posters can be executed in chalks, crayons, colored paper, or in three-dimensional paper sculpture, or other materials that may be suggested by the idea,—such as cloth, wood, etc.

**Picture Making** is the expression of the child's concepts of his world through drawing and painting. ". . . the only kind of expression that should be encouraged in children is that which is natural to childhood." (Tomlinson, R.R., PICTURE MAKING BY CHILDREN, p. 11). The child should draw and paint episodes in his own life and emphasize present experiences. This helps him to clarify his ideas and to appreciate the good in home and school. If life experiences of the child are used as motivation, the illustrating of stories and poems is not necessary unless they have some vital relation to the child's present experience. Creative picture making is a personal, intimate interpretation of the outer or inner world of an individual. It can be very realistic or it can be abstract. Always the art elements of line, color, form, texture, and their relationships, are considered equally with subject matter. Children should appreciate color chords, lines, darks and lights, for their own sakes as they do tones and chords of sounds in music. Scientific drawing is that which accurately records every detail in the subject as is done in botanical drawing. Everything is given the same emphasis. Thus a scientific drawing is generally a means to an end and not an end in itself, although it may be quite beautiful.

**Fantasy** is imaginative drawing that may have some connection with nature or be completely separated from it. Fantasy is the expression of a child's dreams, fears, ambitions, etc., which can be used as a means of studying his personality. Distortion in drawing is legitimate at any age level if it is purposeful. It is distortion only from a limited physical point of view. It is natural from a design point of view. It has been used by artists to bring out meanings ever since the caveman.

**Proportions and perspective** are relative to whatever meaning the child is bringing out. ". . . the word 'proportion' should never be brought into the consciousness of the child. Such a procedure would only inhibit his further creative work, since the child would start measuring proportions and apply rigid methods which are the death of any creative work." (Lowenfeld, CREATIVE AND MENTAL GROWTH, p. 112.) This applies to drawing the human figure, animals, buildings, etc. A help in drawing is to construct first, then draw. There

is no age limit to this method. Things that are thought through and worked out with the hands are never forgotten.

**Cartooning** appeals to most children and can be used to express ideas with symbolism and dramatic distortion when natural proportions would be meaningless. The selection of what to exaggerate and what to simplify can be an individual or group decision. Cleverness and humor should replace silliness. Simplicity in line and dark and light as well as symbolism of an idea should be stressed.

**Murals** are wall decorations. The name is derived from the Latin "muras", a wall; and because of that they should be designed and executed to fit into a wall space. A mural is not an enlarged easel painting, it is an organized design of several aspects of one broad theme. (See unit for Grade V). The selection of the space and an appropriate theme for the mural with the process of execution are important experiences in the social aspect of art education. The project offers an opportunity for the democratic method of teacher-pupil planning. The teacher offers guidance to keep the pupils' plans co-ordinated and to see that each one contributes along the line of his special ability.

**All-over Surface Design** offers experiences in formal and informal arrangements of units. There should be a rhythmic relationship of all the units and an awareness that spaces between units form a part of the design. Repetition should not be mechanical or it becomes monotonous. There should be enough variety in it to establish a dominant pattern. It can be freely drawn or painted, printed, blocked or stencilled using crayons, paints, linoleum blocks or simple substitutes such as potatoes, vegetables, cut out mounted inner tubes, or pieces of wood and metal. It may be an incised line in pottery. In stencilling, the positive, the cut out hole, and the negative, the solid cut-out, can be used as masks for dry-brush painting, spatter, or silk screen work.

**Map-making** offers creative and scientific opportunities in drawing and painting in two or three dimensions. When it is necessary to have accurate contours these may be projected by a lantern on to large paper from a small map or drawn by the use of squares. However, it is an opportunity for careful observing and the use of contour drawing to have children occasionally draw the map freehand. The creative activity consists of the inventing of symbols and decorative units for pictorial maps. Lettering should be part of the whole organization. Color should be significant.

**Landscaping** offers a choice in selection and arrangement of flowers, shrubs and trees to beautify the school grounds. This is a problem in dark and light, color, and breaking up a large area with smaller forms. The use of plants for screening, or enclosing a space, and to make a transition from the ground to the foundation can be worked out in a combination of sketching, diagraming and the making of models.

**Plaster-of-Paris Carving.** Materials: Plaster-of-Paris, a bowl, mixing spoon, water, liquid soap or oil, cardboard box for mold, knife, newspapers.

Fill the bowl half full of water. Sift plaster into it without stirring until it absorbs no more and the plaster forms a little island above the water. Then stir and pour into soaped or greased molds just before the mixture begins to thicken. Anyone who has made fudge knows what this point is. When the plaster hardens (it heats as it hardens) strip away the cardboard and you have inviting chunks on which to carve. Oatmeal box tops make good molds for casting plaques for bas-relief (low relief) or high relief (deeper) carving.

When you begin to cut, if it has become dry, wet it to cut more easily. Work on newspapers to collect the cuttings. After you have experimented with the material, start carving until you get the form you wish to make. To finish, you can paint with a wash and wax or shellac, or think up other ways of finishing that are suitable for the subject.

**Paper Sculpture.** Materials: Paper of several kinds and textures, 4" scissors.

Try some paper cutting for fun to see what kinds of shapes and effects you can get.



This boy has cut the paper around and around; this one has fringed it; and here is braided paper. Someone has discovered how to make paper stand up by rolling it into a cone. It could be a skirt, or a tree, or a silo, depending on what is done to it.

This is such fun that perhaps you could put different things together to hang up to turn in the air and make lovely shadows. Here is a beautiful one of white paper that winds around like a circular stair. Here is a festoon with some ends curled, some straight. Here are interlocking forms.

So, you have discovered that you can cut many different ways: straight, curved, zigzag, wavy. You can build figures by rolling, folding, curling, perforating, or shredding the different parts of the clothing and body. These ways can be used to work out any idea that you have that is suitable for paper.

These objects can stand by themselves or can be pasted to cardboard so that they stick out. Use any ways you can invent to fasten them together. Some inventive people are going to want to make whole scenes of paper of different kinds. It may be a circus with funny people, or make-believe, or themselves, or anything they know or wish to imagine.

**Clay.** Materials: Two crocks with tight covers, burlap to fit inside of one and to overlap on top of the wet or moist clay. The other is for dry clay. Make your own tools. Use orange sticks, lollypop sticks, knives, hairpins. Have plain oil-cloth on which to work; cheesecloth to dampen and wrap around work; coffee tins to hold work.

Progressive experiences in clay: Have a ball of clay that is a nice size to handle. Play with it to find out what it will do for you. If you play too long it will dry and crack. Then wrap it in the cheesecloth that is quite wet. Let it stand until it is ready to work. Clay that is right takes any shape easily, whatever your wish or thought is. You can stroke it or coax it but it will not work for you if you shove it around and punch it. Don't go at it too hard.

Make a shape that isn't anything but is nice to feel with your eyes closed. This is called a "handy" or blind sculpture. It is pure form. Have it bulgy. Are several bulges more interesting than one? Shall they be the same size or different sizes?

By this time the shape will suggest something you can turn it into. It may be a hippo, a boy on his knees, a bear, etc. If you want to save the play shape for a paper weight, take another piece of clay, duplicate the shape and turn it into the person, animal, or object that is suggested. Have it chunky with no parts that can be broken off.

If possible have your piece glazed and fired. If this is not possible paint it with a good color of enamel paint. The piece should be thoroughly dry. Dry away from direct heat about a week. In making bowls, try a thumb bowl first. The Indians did these. Take a small piece of clay and roll it into a ball. If right handed, hold the ball in the left hand. Place the right thumb in the center of the ball with the first finger around the ball to turn it with. Rotate it in the palm of the hand with very light pressure. Continue until you get a good shape. If simple surface decoration is desired, care should be taken that it accentuate the original form.

Try a coil method bowl. (See Supervisor). Try the slab method for tiles and containers.

**Movie-making** is a good culmination in art activity for an experience the class has had, such as a trip together. It is a series of drawings or paintings made by individual members of the class of sequential happenings which are then mounted on a long horizontal strip with or without lettered titles in between. This is fastened between two rollers attached to an open box placed on its side so the roll of pictures can be shown by slowly unrolling the series. It may be constructed with a curtain and attractively designed stage front.

**Soap Carving** is the making of a form by cutting away parts from the outside edges. The finished work should retain most of the original outer form. Soap is an easy medium with which to work. Planning for carving means designing in relation to the outer edges. This means the subject-matter is subordinated to fit the shape. Soft woods such as pine, balsa,

poplar, and redwood offer inspiration to carving. Carving may be in relief; that is, only on the surface, as in cameo carving. Carving may be combined with fret or jig-saw or coping saw cutting to round edges after the shapes are cut out. Planning for the cut-out forms may be done by freely cutting paper.

**Stagecraft** need not be elaborate; large brown wrapping paper can be used for scenery painting, unbleached muslin painted or dyed for costumes, properties can be devised from cardboard boxes, papier-mache, cloth and wood. Design should be kept simple. Effect is more important than detail. All previous experiences in art can be utilized in putting on a play; all members of the group can find some way to use their individual ability. Scenery should be suggestive rather than naturalistic so it will not detract from the actors and costumes. Costumes can be symbolic or interpretative of the character portrayed.

**Puppetry** is stagecraft in miniature and offers the same excitement with the added fun of making a puppet and projecting oneself into it. Puppets can be the hand puppets with a "T" shaped double piece of cloth, fastened to anything that resembles a head: from a carved potato, or an egg shell, to a modelled plaster-of-paris or papier-mache head which must be made with a hollow collar in which to insert the fingers. Marionettes are more complicated with their joints and strings, but can be simplified by making rag dolls or animals and stitching a half-inch flap of material for each joint. Pieces of wood can be fastened together with leather strips or even double adhesive to form a figure. The feet should always be weighted with stones or lead scraps to keep the figure on the stage. They should have a string from each side of the head and one from the middle of the back to balance them. Then use as many as necessary to get arm and leg action required by the character. A marionette is always animated while it is talking and the plays should have lots of action, even if grotesque; because puppets can perform many tricks that child actors can't.

EVALUATION AND APPRECIATION overlap, since full evaluation cannot be arrived at without appreciation. They mean to recognize and feel the worth of design in all art expression. Evaluation is the ability to appraise art, while appreciation is the sensitivity to it and the enjoyment of it.

There are two points of view in evaluation,—the adult's and the child's. Here we are considering only the child's point of view. Children can set up their simple standard and can evaluate together with the teacher.

A part of evaluation and appreciation is just LOOKING. When children develop a love of colors, forms, and rhythms, and learn to recognize the sensations they receive from them, they begin to get a satisfaction from just looking at expressions of them in art of the present or the past, in nature, or in common objects about them.

This looking may be purposeful or idle. It may be a complete esthetic experience in itself, a visual pleasure.

What the child sees is determined by his ability to grasp, his background, environmental influences, his preferences, his needs, his receptivity, his maturity.

Children can be led gradually to appreciate the fact that it is the relationship of colors, forms, lines, and textures which give meaning to their expressions. Response to other people's expressions is also a part of appreciation although much of this doesn't appear before adolescence. Herbert Read says (p. 206 "Education Through Art")

Until then the real problem is to preserve the original intensity of the child's reactions to the sensuous qualities of experience—to colours, surfaces, shapes and rhythms. These are apt to be so infallibly 'right' that the teacher can only stand over them in a kind of protective awe.

Thus it is seen that children have an intuitive sense of design within themselves and it is up to the teacher to help them to become aware of the value of this sense of design

in all their expressions whether they are experimenting, selecting, arranging, or constructing.

### **GRADE EXPECTANCY.**

As in grades one, two, and three, every pupil should have opportunities to enjoy, explore, and contribute at his ability level and to feel personal growth.

Standards are measured by mental, spiritual, social, and esthetic growth. Technical perfection in result is not as essential as the development of an adequate individual style. It is not as important that every pupil draw accurately, as that every pupil approach many phases of Art with an active and inquiring mind.

Pupils at these grade levels should be explorers in Art, in groups and individually. They should learn through rich, exciting, and satisfying first-hand experiences; they should make discoveries, make choices, meet problems, and draw conclusions. As need dictates, terminology is acquired.

Instead of specific grade-level expectancies, these inquiries may be helpful:

Does the pupil express his own ideas courageously?

Is he developing in power to use line, color, form and texture?

Is he developing in the quality of his esthetic judgment? Does he continue to experiment?

### **SOME MEANS OF CULTIVATING ART GROWTH.**

All children go through recognizable stages of growth in art as in language, and with wise guidance this natural growth can be facilitated. An understanding teacher may use specific ways such as the following:

1. Through establishing a favorable atmosphere for co-operative, creative living.
2. Through providing vital and varied worthwhile experiences for the child alone or with a group, and encouraging his personal interpretations and reactions to them as well as to other life experiences.
3. Through giving the children ready access to a variety of art material, and helping them to establish practices of good organization and orderly work habits without developing inhibitions.
4. Through fostering the recognition of functional design in the environment, and the evaluating of advertising and products with regard to significant color and well chosen line and form.
5. Through acquainting parents, administrators, and other adults with the value of art in the life of a child and helping them to understand children's work based on expression of ideas and feelings and design qualities rather than representative copying.
6. Through providing for individual differences of interests, capabilities, and needs and helping to develop social growth.
7. Through making available well chosen examples of 2 and 3 dimensional art of other children, as well as that of artists of the present and past. In order not to foster copying, timing is especially important. When children have just finished an activity, they are often interested in seeing how others solved similar problems.

### **UNIFIED TEACHING — ORGANIZED LEARNING — INTEGRATION.**

“Educationally, the Arts are significant in so far as participation in them leads to integration of the individual as a self and as a member of society.” (Hopkins)<sup>1</sup>

<sup>1</sup> L. Thomas Hopkins, *Integration: Its Meaning and Application*.

Life experiences do not take place in isolated areas nor can we divide the child into little parts. He grows as a complete unit. If his school experiences are to help him to become a better integrated person, an independent thinker and one who is able to meet and solve life's problems, they must be built around activities and experiences as dynamic, absorbing, and challenging as life itself. The school learning can not be isolated facts and details which the child can not integrate as a genuine part of himself but rather they must present problems which have immediate significance and play into his interests and daily living.

A child's interests are always in accord with his stage of physical and mental development and his interests are always directed toward some definite purpose. They may take various forms of expression and these reflect the influences of his home and school life. It is the privilege and duty of the school to direct the child's interests and concerns toward worthwhile goals. The teacher should so plan and guide the school experiences that they will contribute to the total development of the child, meeting his personal needs as well as the social and economic demands of the community and the times.

The types of activities should be varied in order to meet the individual interests and capabilities. The starting point of an activity may originate from any experiences, with special emphasis on any subject matter field; but because "life learnings" can not be isolated, many areas will be explored as the activity progresses, thus unifying the entire activity and helping the child to organize and integrate his learnings and understandings.

Whenever anyone is planning, choosing, or arranging any materials or producing anything visual, the problem becomes an art problem and help may be obtained from the art supervisor.

It is necessary for the teacher to understand the basis for the suggestions of the supervisor, so that they may collaborate, and guard against bringing conflict into the lives of the children.

Following will be found examples of Unified Teaching for each grade.

## **GRADE 4.**

### **UNIT: EARLY NEW ENGLAND.**

Each year the Social Studies curriculum offers rich background for the imaginative teacher and class. Having read through the broad social study requirements for their grade, this fourth grade decided to gather more information before they decided which particular phase to use as a real basic study. They gathered all material available for the year's work, with the teacher selecting and evaluating with them the most appropriate fields of learning. Films were shown of New England, National Parks, the South, and the West, (particularly the development of the West).

The children contributed all they could from the public library, school, and their homes. Stories were read and discussed, and people and friends from the community were invited to come and tell of their experiences and visits. The children took a trip to the Children's Museum where they saw a film on early Western days, and thus the work progressed for two or three months. The children during this time were becoming acquainted with each other and the fields of study until it was decided by the children and teacher to make a detailed study of early New England.

This period of the survey of the United States has provided an introduction to living in the entire United States and brought about a vital interest in the early New England kitchen as the center of activity.

The room next to this classroom was not in use so the group decided to construct a

life-sized kitchen which would go right into the large room. Various committees were elected to plan

- 1 - kitchen size
- 2 - interior walls
- 3 - outside walls
- 4 - fireplace
- 5 - furnishings

Before working very long they realized their limitations and a trip was planned to visit a genuine reproduction of an early New England kitchen. Films on early silversmiths were studied as well as dishes, cooking utensils, clothing, and how these were related to the ways of living, hardships, Sunday activities, and the economics of the time. All this was continually compared with the present, as it is all closely interwoven.

Art was one of the biggest contributing factors to this experience. The kitchen was planned and constructed; stencils were designed and wall paper made; the fireplace was designed and constructed; a rug was braided; candles were hand dipped; candle sticks were designed, modeled, and fired; paper fire-lighters added a touch; and finally a four-wall room mural was made to give it a setting.

The mural started with a fall scene in early New England and developed from that into New Englanders going West, Indian meetings, modes of travel, and the activities involved in this trip.

Many discussions of colors, textures, composition, and techniques were held, sometimes by the entire group, while at other times only a few would be involved. Murals, mural painters, craftsmen and their work were considered many times by the group.

Each child had a carefully lettered personal record book which he kept all through this experience with illustrative pictures, articles, and letters helpful to better understandings. These books were lettered with lettering pens.

This experience culminated in an assembly with designed and blocked invitations for home. All children took an active part—some dyeing old material for costumes, some sewing, and some constructing.

Newton Schools. Teacher, Maude Shapleigh.

## **GRADE 5.**

### **UNIT: MODELLING.**

A Fifth Grade class studying the Western Movement was fascinated by its connection with the American Indians. They were interested in the fact that Indians carried on more quiet pursuits than the war-like and cowboy-chasing aspects of fiction and movies. This led to a discussion which culminated in wanting to make clay bowls as the Indians did.

The teacher demonstrated the making of a simple coil with clay, showed how to attach it to a base of a flattened ball of clay and how to make the "pot" larger by placing the coil outside, or smaller by placing the coil inside the wall of coils already modelled together. The boys and girls modelled simple shapes, discussed proportions (decided that either the top or bottom part should be larger, that to make them the same size did not make the shape interesting) experimented with handles and spouts. Since it was possible to have these fired they decorated them with slip in earth colors as the Indians did. They did not copy Indian designs but made up their own geometric shapes or symbolic designs in bands and borders or medallions.

The handling of clay so interested the class that they wanted to know other ways to use it. This time the teacher suggested that they take a lump in their hands: pack it, pat it, push part of it in, pull part of it out, use their fingers, then the soft part of the hand under the

thumb. When they had manipulated the clay for awhile, she urged them to look at these forms or "handies" while turning them around. Could they imagine any recognizable shape in them? If so, did the form need more modelling to define it more clearly? The pupils were encouraged to keep the shapes simple and merely suggestive. Some children worked out the shapes they saw while others discarded the forms and started again with a preconceived idea in mind and planned to push the clay into a shape to resemble their idea. Some combined both methods until they arrived at a satisfactory shape. Sometimes extra pieces of clay were modelled and jointed to the original mass. The children soon developed a sensitivity to the particular quality of clay as heavy and solid. They realized that long, thin, jutting-out parts were not suitable, nor were thin sharp edges. They became aware of the third dimension—the roundness and "aroundness" of the object.

Most of the figures depicted ideas close to the experiences of the children: their pets, football players, sailors, cowboys, playmates, children in the school orchestra, and clowns. These, too, could be fired, so they experimented with more underglaze and some overglaze. Some were painted with poster colors or tempera after the firing, then shellacked or waxed.

Each pupil had a bowl and a figure of clay besides an exciting adventure in a new material. Many children brought ceramic pottery and figures from home, and a general appreciation of this process was developed. They discovered that art is very useful in living.

The teacher did a minimum of demonstrating—coils, wedging together the pieces of clay, and a few manipulations. She made no finished piece. She stressed the importance of having the clay the right consistency, orderly work habits, and the value of original thinking while feeling the clay in your hands—sometimes it tells you what to do, sometimes you tell it what to do, but the finished piece must be satisfactory to the maker, pleasing and well-made. Most of her comments were to individuals for encouragement and praise, or of caution if the pupil were forcing the clay into brittle, weak forms. With the group she discussed standards: simplicity, a unified form, a quality of solidity, even though there were varied thicknesses and some open spaces, rhythmic relationships of parts, and the appropriateness of the idea to the characteristics of clay.

## **GRADE 6.**

### **EMBROIDERY AND WOODWORKING.**

A sixth grade did some doodles to loosen up and to see what unusual shapes they could find. To start, natural gestures were made in the air, such as when one person is talking to another. Then, the gesture was recorded on the paper and the doodle developed from there. Often forms appeared that were more beautiful than any the pupils could have drawn directly. They found many humorous animal shapes that needed only an eye or a tail to make them more recognizable. The same shape was found to have a variety of possible uses. They realized, with the guidance of the classroom teacher, that these forms had very beautiful line quality.

After "blowing them up" on 18" x 24" newsprint using a heavy line they used them as classroom decorations and conversation pieces. Everyone who came in was introduced to the animals. They had a great deal of fun with them before they took them down and put them away.

At this time the class had been doing a great deal of flat, two-dimensional work. Everyone felt that a change of material was needed. They had done some beautiful, direct painting—spreading colors and textures on the paper and developing them into growth forms. There was a desire to do something with these, so when embroidery was suggested, several girls thought of things they would like to make, such as bags, pocketbooks, etc. They brought various materials, such as monks cloth, varied colors and weights of yarn, and large-eyed needles,

and were soon happily working out their problems. They invented their own stitches, asking for help on some; many used stitches to create textures. Variety of color and shapes was stressed. The children gained a great deal from the discussion about colors—"This color should be picked up and put over there"; "It's all too dark, it needs more light values."

But this left many boys and girls in this class of over thirty who did not want to embroider. The classroom teacher thought of a nice piece of wood a boy had brought in some time ago and suggested that they might like to do something with it. The idea "took". In a very short time each pupil in this group had a piece of soft wood and some kind of carving tool, either a jackknife or parts of exacto kits.

Now the problem arose as to what to carve. Each one could do what he or she wished. They were given over-night to work out a beginning idea. Next day, to the consternation of the teacher, tight little drawings of horses and dogs appeared. (She had good reason to believe that some were copied.) They were not suitable for wood and lacked consideration of the outside shape. She pointed out these things. At the same time illustrative material was shown them of fine simple and beautiful forms of animals and figures from the art of the past and the present. The teacher was very careful not to show them any illustrations which would solve their problem for them. Rather was it material of forms in good design which might help them to solve their own problems.

The class commented on these and discussed them. The teacher brought out the meaning of the lines, what the artist was expressing of grace, humor, dignity, etc. The children realized that they would have to begin again, working not only in terms of quality in the design, but thinking of the nature of the wood.

Then someone remembered the doodles! Just the thing! Out they came to be scrutinized with new eyes as sources of new shapes. Each child using his own, deduced, changed, and adapted it to his wood.

One girl, as she got to digging, found the wood hard. She wondered if she couldn't leave the lumps. She was encouraged to do this and went ahead with enthusiasm. Before this she had shown a rather petty disposition; her interest in carving seemed to help.

Many interesting textures developed from the different ways each child used his knife. Contrasts of smooth and rough surfaces appeared. Different depths of certain areas were used to contrast shallow parts. The shapes were genuinely attractive. The pupils gained a real appreciation of these as well as the beauty of the wood itself, including the grain and even the clean smell that came out as they carved and sanded. They experimented with several kinds of finishes donated by some of the parents. Finally, they reluctantly let their treasures go for an exhibit, but they made sure that they were returned to them, later.

### **CONTESTS AND COMPETITIONS.**

The dangers of these in an elementary school are many:

1. The basis of a standard of rewards is substituted for interest in the work.
2. The reward is the thing for which the child will work and he loses interest in the school activities which he should support and which are his responsibility.
3. It is an artificial stimulation that implies a lack of recognition of the many ideas in the natural situation.
4. To achieve 'results' dishonest methods are often used.
5. It often exploits children for adult purposes.
6. A child can get a false idea of his abilities.

### **STANDARDS FOR MEASURING ART DEVELOPMENT.**

The basis for evaluation is on individual maturity, not chronological age.

**Standards for the teacher** should be those of interpretation, of emotional content, and art quality, or the interweaving of esthetics and subject matter. In judging pictures refer primarily to the picture quality and not necessarily to the literal details. There should be a harmony of agreement between the idea of the picture, the feeling, and the material used. Criticism should be positive, never negative.

**Standards of achievement for the child:** Does he perceive the art qualities and not merely the physical or story aspect? Does he have an individual way of interpreting? Does he have good design? Does he organize color, line, and dark and light, in relation to his ideas? Is there a center of interest?

Does the work show progress in terms of power and resourcefulness in handling materials?

Does he make his own choices and decisions, trying them out and making better ones? Progress is based on individual growth, not in competition.

If marks are necessary, they should be made on the basis of a threefold evaluation:

1. Creativity in idea and use of materials;
2. Evidence of either direct or indirect understanding of design;
3. Growth in understanding of his own power of expression and in appreciating the efforts of others.

**SUMMARY.** To the understanding teacher the child reveals his inmost thoughts and feelings through his art. This enables her to work better with him, and more adequately to guide him. Through his art the child tends to organize and clarify his ideas in concrete form. He is stimulated thereby to new endeavors. He comes to respect the ideas of others by learning from them and working with them. Such experiences foster the spirit of democracy in the child and contribute to his growth as a world citizen.

## BIBLIOGRAPHY.

### Teacher.

ART EDUCATION TODAY. Art Annual, Bureau of Publications, Teachers College, Columbia University, New York: 1935 - 1943, 1948.  
Reports of significant, current experiments in the field of art education.

Browne, Sybil, et al., ART AND MATERIALS FOR THE SCHOOLS. New York: Progressive Education Association, 1943. Based on thorough classroom experience. Inventiveness is stressed. The viewpoint is modern and the emphasis is on the activities.

Cole, Natalie R., ARTS IN THE CLASSROOM. New York: John Day Co., 1940.  
Vigorous presentation of actual conversations during creative activities.

D'Amico, Victor E., CREATIVE TEACHING IN ART. Scranton, Pa.: International Textbook Co., 1942.

A "creative development of the child in relation to each of the arts," with suggested methods suited to each grade level.

Dewey, John, CONSTRUCTION AND CRITICISM. New York: Columbia University Press, 1930.

Twenty-five pages which should be read often by everyone who is working to develop children.

Dunnett, Ruth, ART AND THE CHILD PERSONALITY. London: Methuen and Co. Ltd., 1948.



Hildreth, Gertrude H., CHILD GROWTH THROUGH EDUCATION. New York: Ronald Press, 1948.

Lowenfeld, Viktor, CREATIVE AND MENTAL GROWTH. New York: The Macmillan Co., 1947.

It should be studied by all administrators and parents.

MacDonald, Rosebelle, ART AS EDUCATION. New York: Henry Holt, 1941.

Owatonna Art Education Project, Ziegfield, E., and M. E. Smith, ART FOR DAILY LIVING. Minneapolis, University of Minnesota Press, 1944. . . ART UNITS FOR GRADES 4 - 6. Minneapolis: University of Minnesota Press, 1944.

Reports of the unique experiment in art education carried on by a College of Education, with a grant from the Carnegie Foundation. A dynamic art curriculum has evolved.

Shultz, Harold A., and J. Harlan Shores, ART IN THE ELEMENTARY SCHOOL, Vol. 46: Number 16. Urbana, Illinois: University of Illinois Bulletin, College of Education.

Tomlinson, R. R., CHILDREN AS ARTISTS. London and New York: Penguin Books Inc., 1947.

**CHAPTER XI.****HEALTH EDUCATION.**

<b>Introduction</b> . . . . .	<b>142</b>
Philosophy of Health Education.	
General Objectives.	
The Teacher as a Factor in the Total Health Effort.	
The Teacher's Responsibility in the School Health Program.	
The Teacher's Preparation for Health Work.	
Procedures Useful in Health Teaching.	
<b>Overview</b> . . . . .	<b>148</b>
Areas of Growth and Major Fields.	
Specific Objectives.	
The Cycle Plan of Grade Allocation and Emphasis.	
Overview Chart, Six Grades.	
<b>Material by Grades</b> . . . . .	<b>154</b>
Two Sample Units.	
Grade 4.	
Abstract of Chart.	
Chart of Objectives, Suggested Units, and Activities.	
Units.	
Grade 5.	
Abstract of Chart.	
Chart of Objectives, Suggested Units, and Activities.	
Units.	
Grade 6.	
Abstract of Chart.	
Chart of Objectives, Suggested Units, and Activities.	
Units.	
<b>Bibliography</b> . . . . .	<b>196</b>

**INTRODUCTION.****PHILOSOPHY.**

"It has finally been recognized that the responsibilities of the school include far more than the mere teaching of subject matter. The child must be prepared for life in a democracy. He must be taught to develop a healthy body, an educated mind, a self-disciplined, self-reliant, socially-minded personality."<sup>1</sup>

"Health teaching today aims at more than the mastery of facts. It is concerned with the

1. Health in Schools (Twentieth Yearbook of the American Association of School Administrators, National Education Association, Washington, D. C. 1943) p. 9.

improvement of human living. So conceived, much that is called education is in reality health education, and that which is termed health education becomes important in every school. The goal of intelligent self-direction of health behavior by every person in our society is an ideal toward which to strive.”<sup>2</sup>

“The health of the nation has not reached an ideal status or even a satisfactory status; it nevertheless is no cause for despair. It is neither as good as it could be nor as bad as it might be, and it is constantly improving. The opportunity constitutes a challenge to the schools and an obligation to evaluate their present contributions with a view to improvement.”<sup>3</sup>

“The school is not the sole agency responsible for the health of the people . . . Yet the schools are a vital factor. In the school is offered unparalleled opportunity for acquiring health knowledge, forming health attitudes, and establishing health practices.”<sup>4</sup>

## GENERAL OBJECTIVES.

It is the aim of health education to serve the purposes of education in a democracy by (a) the promotion of sound physical and emotional health in the individual, and (b) the promotion of such adjustments as enable the individual to take his place as a responsible member of his family, school, and community groups.

## THE TEACHER AS A FACTOR IN THE TOTAL HEALTH EFFORT.

The Twentieth Yearbook points out that

Health is so vitally a part of all living experience that it is impossible to circumscribe the health teaching program with courses, plans, and study outlines. The child gains health understandings, exhibits behavior of import to health, and develops attitudes toward such behavior in all phases of his school experience. These continuous experiences and concomitant learnings are of such importance and the understanding of their relation to all education so necessary that each teacher must become aware of her role in health guidance and teaching if the school health program is to be effective in health improvement. Health instruction is the responsibility of every teacher.

(The following section is a reprint from GUIDE TO THE SCHOOL HEALTH PROGRAM, Massachusetts Department of Public Health, 1940.)

### I. The Teacher's Responsibility in the School Health Program.

#### A. Healthful School Living.

##### 1. Physical Environment.

- a. Adjust desks and seats twice a year — oftener if necessary.
- b. Place thermometer approximately four feet from the floor on an inside wall.
- c. Keep temperature about 68°.
- d. Allow no direct sunlight on any desk, yet arrange curtains or artificial lights in such a way that the darkest desks get not less than 10 foot candles of light (to determine foot candles of light call local electric illuminating company to make tests).
- e. Always have windows open when physical exercises involving running, jumping, etc., are in progress.
- f. Do not permit children to clean erasers in such a way that dust will be inhaled. In addition to the danger of irritating the respiratory tract with sharp particles of mineral matter, there is some menace to the health

2. Ibid, p. 89.

3. Ibid, p. 11.

4. Ibid, p. 11.

when yellow chalk, which may contain from 2.2% to 8.8 % of lead is used. "Art crayons", dark green, yellow, and orange, have been found to contain 6.3% to 18.7% of lead.

2. Emotional Environment.
  - a. Keep a good emotional adjustment to life, getting help in solving personal problems when necessary.
  - b. Keep atmosphere of classroom positive and cheerful.
  - c. Realize that the "problem child" usually needs help rather than punishment.
3. Healthful Arrangement of School Program.
  - a. Arrange work requiring the greatest concentration so that it comes early in the day.
  - b. Arrange program so that there will be alternation of concentration and activity.
  - c. Arrange for adequate recesses.
  - d. In high school arrange through faculty co-operation for a minimum of home work.
  - e. Know the local agencies which give help to maladjusted children.
  - f. Use discriminating praise rather than blame as motivation.
  - g. Give every child, no matter how dull, opportunities for success along some lines.
  - h. Discuss problems with individual parents in a spirit of mutual endeavor.

#### B. Communicable Disease Control.

1. Inspect children at the beginning of each session.
2. Exclude children showing symptoms suggesting communicable disease if neither physician nor nurse is available.

Symptoms suggestive of communicable disease are sneezing, coughing, sore throat, inflamed eyes, flushed face, feverishness, pale face, nausea, drowsiness, restlessness, eruptions, enlarged glands, general feeling of acute ill health, headache.

3. Report such exclusion to superintendent's office.
4. Refuse to re-admit any child returning after communicable disease unless he has a certificate from the board of health or the school physician.
5. Stay away from school during the first few days of an acute cold and encourage children to do the same.

#### C. Health Guidance.

1. Understand the aims of the school physician and nurse.
2. Develop in the children the right mental "set" toward the different examinations.
3. Encourage the children to have their defects corrected.
4. Collect return slips from parents and physicians and give to nurse at her next visit.
5. Be familiar with the technique of simple first aid.
6. Be familiar with the technique of testing vision and hearing.
7. Test early in fall and enter results on physical record card.
8. Weigh and measure the children periodically — call to the attention of the nurse any child who does not grow over a period of time. Enter results of weighing and measuring on physician's record in fall, winter, and spring.

9. Write names of children on "Summary of Findings of Health Examination" sheet and discuss children with nurse after she has noted the defects.
10. Refer to the physician or the nurse any child who appears acutely ill. If they are not available, send child home according to standing orders.
11. Call to attention of physician or nurse children who appear under par. Some places find an observation sheet (See Page 20) very useful.
12. Keep a record of absence for illness and report to nurse any child frequently ill or having long periods of illness.
13. Assist the nurse in making arrangements to get children to the dentist or dental clinic.
14. Collect dental certificates if desired.
15. Understand the underlying principles of good nutrition and food selection.
16. Observe lunches brought by children.
17. Through tactful personal suggestions as well as classroom instruction encourage children to bring or to choose proper lunches. (See also suggestions for observation, anecdotal records, and self-evaluation, in Chapter III of this Guide.)

#### D. Health Education.

1. Make the entire school program contribute to health education. There is no aspect of the program which may not be made to provide for the pupil's experience in healthful living, or which does not provide an opportunity to gain information and exercise of judgment in health matters.
2. Allocate a certain amount of time each week for more formal health instruction.
3. Use incidental happenings at home, in school, or in the community as opportunity for health teaching.
4. Correlate health teaching with other subjects in the curriculum.
5. Understand the elements of physiology, physical and mental hygiene, and child growth and development.
6. Arrange to take courses occasionally which will help with the conduct of the health program.
7. Use in health instruction the best current pedagogical methods.
8. Be familiar with the sources from which help in health instruction may be obtained.
9. Co-ordinate so far as possible the child's life at home, at school, and in the community.

## II. The Teacher's Preparation for Health Work.

### A. The teacher should have

1. A thorough knowledge of personal hygiene with enough understanding of basic biological principles to make hygiene meaningful.
2. A knowledge of simple First Aid.
3. A knowledge of child growth and development.
4. A knowledge of the characteristics of a well child and ability to recognize deviations from normal.
5. A knowledge of child hygiene and interrelationship of emotional and physical health.

6. An understanding of the purpose and scope of the school health program
  - a. as a whole.
  - b. with respect to the teachers' special responsibilities and necessary techniques for fulfilling them.
7. A knowledge of important public health measures which are being used to protect health.
8. An understanding of differences between public and private agencies and what the most important ones are.

### III. Procedures Useful In Teaching Health.

9. An elementary knowledge of the social, economic, and legal problems involved in school and public health work.

There is no particular "method" for teaching health. The problem is so broad that almost every good teaching procedure may be applied at one time or another. The following specific procedures may be useful. They should be used only when they are likely to aid in achieving the objective desired, but never as ends in themselves.

#### 1. Direct Teaching.

Health lessons as such, using any good type adapted to the problem, may be used. Health may be taught at times as science or as social studies; as language, using writing, reading, and discussion. It should be kept in mind always, however, that the subject matter should be presented primarily as an aid to a way of living rather than for itself alone.

#### 2. Use of Opportunities Arising in Other Subject Matter Fields.

There is much health content inherent in other subject matter fields. Wherever this is true, integration will facilitate and enrich health learnings. Artificial correlations lack educational value and frequently defeat educational objectives. Parodies of nursery rhymes or other literary or music classics are examples of this misuse of the ideas of correlation. Subjects offering rich opportunities for health learning are physical education, science, social studies, and literature (particularly biography).

#### 3. Use of Incidents as They Occur.

Much health teaching is more effective if motivated by an actual incident occurring within the child's experience. Such incidents may occur in school and be witnessed by the child, or they may occur outside of school and be reported by him, or the teacher may create an incident. It should be borne in mind, however, that much that is important may be omitted if health is taught only "incidentally". Careful planning is essential to insure that the teacher is prepared to make best use of incidents when they do occur and to introduce such other necessary phases of health as are not raised by any occurrence. As one primary teacher has stated it, "Health teaching is incidental to the child but definitely teacher-planned". Some incidents which may be used to motivate better health learnings are (a.) weighing and measuring child; (b.) loss of a tooth; (c.) prevalence of colds and communicable diseases in the group; (d.) any injuries children may receive; (e.) visit of doctor, nurse, or dentist to the school; (f.) the school lunch; (g.) a new baby at home; (h.) someone goes to the hospital; (i.) service organization drives (Community Chest, etc.).

#### 4. Use of Problem Solving.

Many health factors revolve around real school problems. Vital health learnings may be acquired through finding, analyzing, and attempting to solve an existing problem of significance to the child. Two types of problems are

- a. Practical problems actually arising in school or community organization, such as "Making our recess play safe"; "Keeping correct classroom temperatures".

- b. Problems arising out of a possible child experience, such as "Planning a picnic"; "Choosing a meal at a restaurant"; "Caring for a pet".

#### 5. Use of Creative Activities.

Health learning is often greatly enriched or reinforced by some activity which springs from a child's desire to express what he discovers or learns. Hence, a play written and produced in order to show parents or classmates what has been learned is of much greater educational value than one which is found in a book and coached by the teacher in order to teach health concepts to the participants. Excellent opportunities for creative expression in the health field lie in such activities as

- a. Oral presentations—talks, discussions, debates.
- b. Dramatization (writing and producing)
- c. Writing stories, poems, articles, reports, etc.
- d. Making charts, graphs, diagrams, etc.
- e. Painting, drawing, modelling.
- f. Constructing models, sand tables, etc.
- g. Making scrap books
- h. Making and organizing collections.

#### 6. Use of Pupil Observation.

Since many health concepts can be learned best by observation of actual situations, opportunities should be provided for broadening the school experience to include contact with persons and activities in the community. Such opportunities may include trips, visits, interviews, and surveys.

#### 7. Use of Pupil Organization.

Many types of democratic group organization are logical and effective in the total program of health learning. These organizations should grow out of group enterprises of real concern to the children rather than be imposed merely to serve adult purposes. Care should be taken that schools are not "over-organized" and that privileges and responsibilities are shared. Some useful types of organizations are health clubs, safety patrols, committees, and councils.

#### 8. Use of Guidance (individual and group).

Since health is a quality which grows out of a way of living, much learning occurs in situations of daily experience. Wise discussions and guidance in such actual situations is a powerful means of securing true health outcomes. Such guidance should follow sound psychological principles with emphasis upon friendly advice, encouragement, positive values, and respect for personality. Nagging, disapproving, or prying into the child's or his family's personal affairs should be avoided. In group discussions care should be taken not to call attention to the shortcomings of any individual child. Opportunities for health guidance arise also in relation to solving personal health problems (emotional and physical).

#### 9. Use of Audio-Visual Aids.

Audio-visual aids are helpful if they logically fit into the children's discussion of problems. They may be used to answer questions already raised, or to initiate the study of a problem. Types of useful aids are charts, pictures, models, actual objects, films, posters, graphs, maps, blackboards and bulletin boards, exhibits, scrap books, books, magazines, newspapers, pamphlets, radio, talks, experiments, demonstrations, stories.

**OVERVIEW.****AREAS OF GROWTH AND MAJOR FIELDS.**

Since good physical and emotional health is governed by biological law, the material in this curriculum is organized to focus emphasis upon the growth of children in three large areas directly based upon biological functions. In each area are major fields representing the most vital needs of the elementary school child. The areas and major fields are as follows:

AREAS OF GROWTH	MAJOR FIELDS
Organic functioning	Eating
	Elimination
	Physical activity
	Sleep, rest, relaxation, and recreation
Adaptation to physical environment	Protection against disease and deterrents to growth
	Protection against injury
	Adaptation to atmospheric conditions
Adaptation to social environment	Relationships to others
	Personal appearance and grooming

Certain aspects of health education such as mental hygiene, safety education, the effects of alcohol and drugs, dental hygiene, are so closely interwoven with other health problems that they do not appear labelled as such in the areas of growth or major fields, but are handled as units or parts of units appearing frequently in several fields.

**MENTAL HYGIENE.**

Since the mental health of children in the elementary grades is the result of informal experience rather than direct teaching, influences for or against mental health necessarily permeate the entire curriculum. In the health course of study, provision for normal emotional development is made throughout the entire program. Both the approach and content emphasize an honest and realistic recognition of health problems both for individuals and groups, practical guides for effective efforts toward solving those problems, and a happy and sane attitude about health and health behavior. More specifically, in the area of growth "Adaptation to Social Environment" are such units as

"IT Pays to Keep Clean."

"Are You Good Company?"

"Keep Your Chin Up."

"My Share in Making the Home."

"Bringing Up Pets."

In so far as these units afford opportunities for helping the child to grow in self-reliance, attractiveness to others, and helpfulness in his school, home, and community relationships, they are builders of sound mental health.

**EFFECTS OF ALCOHOL AND DRUGS.**

In the elementary grades the best instruction in this field consists of emphasizing those wholesome health concepts and habits which will tend to minimize need for or interest in the use of stimulants and drugs.



Any discussion of harmful effects is incidental in the larger health units and should be used at the discretion of the teacher as the need arises. Some direct teaching in this field appears in the fifth or sixth grades in such units as "I Know Better Than That!" (critical evaluation of commercial advertising), "The Use and Misuse of Drugs", and others.

#### SAFETY EDUCATION.

Throughout the Health Guides are interspersed opportunities and suggestions for building safety concepts. The greatest emphasis is to be found in the section, "Protection Against Injury" and in the area of growth, "Adaptation to the Physical Environment". (See Overview Chart.) In this section, safety in its broadest sense is the underlying objective.

A chapter in this Guide is devoted to Safety Education.

#### SPECIFIC OBJECTIVES.

The specific objectives of health education are the particular knowledges and understandings, attitudes and appreciations, habits and skills in each major field which are significant for healthful living at the age level of the child. The TWENTIETH YEARBOOK states that

If it is agreed that the measure of success of health instruction is the influence on the behavior of the child, then it is readily seen that emphasis on facts and knowledge is of subordinate importance to the development of desirable practices, attitudes, and understandings, particularly in the elementary school child. Knowledge functions as it bolsters practice or makes it intelligible. Health instruction in the elementary school is primarily a matter of helping the child to live most healthfully each day and to learn to meet changing situations in a healthful manner.<sup>5</sup>

#### THE CYCLE PLAN OF GRADE ALLOCATION AND EMPHASIS.

The cycle plan is an attempt to avoid two common faults in health courses of study: (1) the tendency to allot health topics in a subject matter fashion to grades regardless of the need of the child at each age level; and (2) the tendency to attempt to teach everything about health in every grade, thus giving rise to very superficial learning and tiresome repetition.

In this curriculum, all areas and fields are touched upon in Grades I and II because of the need at this age for habit formation and the establishment of desirable attitudes in every field. After Grade II, each major field is placed for emphasis either in Grades III and V, or in Grades IV and VI, thus providing opportunities for thorough teaching in each field in keeping with the child's expanding interests, needs, and capacities for understanding.

In two areas, "Protection Against Injury", and "Relationship With Others", units are listed in both the fifth and sixth grades instead of being limited to the fifth. Teachers should place these units where they seem most needed and can be of greatest value to their particular group of children.

This plan should, in no sense, prevent a teacher from teaching in any field in which needs arise in her group. Incidental teaching along all lines will, in most cases, have to continue through all six grades.

The allocation of teaching emphasis is shown in the Overview Chart for Grades I-VI. For details for Grade I-III see the Curriculum Guide for Primary Grades.

5. Ibid. p. 60.

## OVERVIEW CHART: GRADES 1-6

		GRADES 1 AND 2	GRADE 3
		<p>SCOPE: All fields are touched upon for needs of daily living in home, school, and the immediate community.</p> <p>CHIEF MOTIVATION: Health for <b>Growth</b>.</p> <p>GENERAL EMPHASIS: Simple concepts and formation of right habits.</p> <p>(GRADE 2: Expansion and reinforcement of learnings of GRADE 1.)</p>	<p>SCOPE: Beginning of cycle plan for direct teaching in selected fields. Incidental teaching in all fields as need arises.</p> <p>CHIEF MOTIVATION: Health for <b>Growth and Play</b>.</p>
AREAS OF GROWTH	MAJOR FIELDS		
ORGANIC FUNCTIONING	EATING	<p>Need of right foods for growth.</p> <p>Habits of eating, especially in relation to breakfast, and lunch at school.</p> <p>Proper foods for children.</p> <p>Grade 1. 1. Good Things to Eat and Drink.</p> <p>2. Having Breakfast.</p> <p>Grade 2. 1. Going Marketing with Mother.</p> <p>2. Learning about our Teeth.</p> <p>3. See Us Grow.</p>	
	ELIMINATION	<p>Need for regular elimination.</p> <p>Guidance in school habits.</p>	
	PHYSICAL ACTIVITY	<p>Play as a part of the life of children and animals. Association of ideas of happiness and comfort with ideas of good posture.</p> <p>Grade 1. 3. How We Spend Our Play-Time.</p> <p>4. Learning to Use School Furniture.</p> <p>Grade 2. See No. 3—See Us Grow.</p>	<p>Beginning of understanding of what constitutes good posture. Concepts of importance of vigorous outdoor play for building strong bodies.</p> <p>1. Our Bodies in Action.</p> <p>2. We're Happy Because We're Healthy.</p>
	SLEEP REST RELAXATION RECREATION	<p>Need of sleep and rest for growth.</p> <p>Willingness and ability to relax.</p> <p>Grade 1. 5. Getting Ready for Bed.</p> <p>Grade 2. See No. 3—See Us Grow.</p>	<p>Concept of sleep and rest as a means toward happy living. Willingness to be self-directing about going to bed on time. Understanding of proper conditions for adequate sleep.</p> <p>3. Between Supper and Bed-time.</p> <p>4. Sleeping for Pep.</p>

GRADE 4	GRADE 5	GRADE 6
<p>(Continued from Grade 3)</p> <p>GENERAL EMPHASIS: Broadened concepts and increased self-direction of habits. Increased consideration for others.</p>	<p>SCOPE: Continuation of cycle plan and incidental teaching as need arises.</p> <p>CHIEF MOTIVATION: Health for <b>Growth, Athletics, Personality and Citizenship.</b></p> <p>GENERAL EMPHASIS: Growing scientific attitudes. Increased feeling of personal responsibility as a member of the group. Simple consumer points of view. Increased emphasis on health as a means of success.</p>	
<p>Increased detail as to necessary daily foods. Expanded concept of daily meals, especially noon lunch. Beginning of special study of milk as food.</p> <ol style="list-style-type: none"> <li>1. Noon Lunch at School.</li> <li>*2. Stoking our Body Engines.</li> <li>3. Learning More About Milk.</li> <li>4. A Pleasing Smile.</li> <li>5. My Growth Chart.</li> </ol>		<p>Simple concepts of digestion. Relation of food to successful living. Economics of food purchases. Critical evaluation of advertising.</p> <ol style="list-style-type: none"> <li>*1. Food and Successful Living.</li> <li>2. What Happens to the Food We Eat.</li> <li>3. Biting Facts.</li> <li>4. Getting the Most for Your Money.</li> <li>*5. I Know Better Than That.</li> <li>6. Our Health—An Asset to Our Nation.</li> </ol>
<p>Concept that waste materials result from the production of energy. Necessity of proper elimination of body wastes.</p> <p>Taught incidentally with other units.</p>		<p>Importance to health of proper elimination of body wastes. Avenues of elimination.</p> <p>Taught incidentally with other units.</p>
	<p>Increased understanding of posture and its relation to successful living. Expansion of ideas of childhood play into broader recreational fields.</p> <ol style="list-style-type: none"> <li>*1. The Making of an Athlete.</li> <li>2. How Our Community Plays.</li> <li>*3. Planning a Picnic.</li> <li>4. Hiking and Biking.</li> <li>5. Our Body Machine.</li> </ol>	
	<p>Simple scientific understanding of the function of sleep. Significance of recreation as a means of relaxation.</p> <ol style="list-style-type: none"> <li>6. Why Sleep?</li> <li>7. Hobbies.</li> </ol>	

**OVERVIEW CHART: GRADES 1-6 (continued)**

AREAS OF GROWTH	MAJOR FIELDS	GRADES 1 AND 2	GRADE 3
ADAPTATION TO PHYSICAL ENVIRONMENT	PROTECTION AGAINST DISEASE	<p>Beginning of fastidious behavior in use of own personal things and keeping unclean objects out of mouth. Feeling of confidence rather than fear of health personnel and procedures.</p> <p>Grade 1. 6. Our Friends, the Doctor, Dentist, and Nurse. 7. Protecting Ourselves Against Sickness.</p> <p>Grade 2. 4. A Day in Bed. 5. Billy Has the Measles. 6. When We Have Colds.</p>	
	PROTECTION AGAINST INJURY	<p>Habits of safe conduct without excessive fears. Extension of safety habits with child's broadening experiences.</p> <p>Grade 1. 8. Road to School 9. Playing Safely.</p> <p>Grade 2. 7. Our Wonderful Eyes. 8. Safe Places to Play in Our Community.</p>	<p>Understanding of the importance of good feet and how to care for them.</p> <p>Safety understandings extend to wider areas of activity.</p> <p>5. One Pair of Feet. 6. Going Places Safely. 7. Healthful Classroom. 8. Keeping Our Community Clean.</p>
	ADAPTATION TO ATMOSPHERIC CONDITIONS	<p>Beginning of judgment concerning clothing in relation to health.</p> <p>Grade 1. 10. Protecting Ourselves Against the Weather.</p> <p>Grade 2. 9. Dressing for the Weather Man.</p>	<p>Broadened concepts of effect of weather and seasons on man's way of life and need for wise adjustment in activities, clothing, heating, and ventilation.</p> <p>9. A Rainy Day. 10. Outdoors Through the Year. 11. How to Have Fresh Air.</p>
ADAPTATION TO SOCIAL ENVIRONMENT	RELATIONSHIP WITH OTHERS	<p>Friendliness and helpfulness at home and at school.</p> <p>Grade 1. 11. Making New Friends. 12. What We Do at Home.</p> <p>Grade 2. 10. Helping Mother. 11. Helping to Keep Our Community Clean.</p>	<p>Growing independence in taking responsibility for own share of work, care of own possessions, etc.</p> <p>12. Helping at Home. 13. Our Own Belongings.</p>
	PERSONAL APPEARANCE AND GROOMING	<p>Simple habits of personal cleanliness and neatness.</p> <p>Grade 1. 13. Getting Ready for School. Grade 2. 12. Looking Our Best.</p>	

GRADE 4	GRADE 5	GRADE 6
<p>Concepts of some means by which disease is spread. Increased sense of responsibility for others.</p> <ol style="list-style-type: none"> <li>6. Away With the Fly!</li> <li>7. Keeping Your Cold to Yourself.</li> <li>8. Unseen Enemies.</li> <li>9. Community Health Services.</li> <li>10. Healthful Surroundings.</li> </ol>		<p>Understanding of the methods of control of communicable diseases. Concept of personal and community responsibility for adequate control.</p> <ol style="list-style-type: none"> <li>7. Friends or Enemies.</li> <li>8. Fighting Communicable Diseases.</li> <li>9. My Yearly Health Examination. (See also No. 12)</li> </ol>
	<p>Increased appreciation of bodily functions and need for their care and protection to maintain efficiency. Beginning of critical evaluation of advertising, superstitions, etc.</p> <ol style="list-style-type: none"> <li>8. How Our Eyes and Ears Work.</li> <li>9. Use and Misuse of Drugs.</li> <li>10. What We Should Know About First Aid.</li> <li>11. What Can We Believe?</li> </ol>	<ol style="list-style-type: none"> <li>10. Use and Misuse of Drugs. (A continuation from Grade V.)</li> </ol>
	<p>Broadened concept of effect of climate on lives of people in other parts of the world, with adequate self-direction concerning own adaptation to climate.</p> <ol style="list-style-type: none"> <li>12. Clothing for Every Climate.</li> </ol>	
	<p>Beginning of awareness of simple facts of mental hygiene. Increased sense of own importance as a member of the group, especially in the home.</p> <ol style="list-style-type: none"> <li>13. Are You Good Company?</li> <li>14. My Share in Making the Home.</li> <li>15. Keep Your Chin Up.</li> <li>16. Bringing Up Pets.</li> </ol>	<ol style="list-style-type: none"> <li>11. What Am I Worth to My Employer?</li> <li>12. What Makes a Hero? (In Athletics? In Science? In Health?)</li> <li>13. Our World Needs Good Sports.</li> </ol>
<p>Broadened concepts of importance of cleanliness and good appearance, especially in the care of the teeth.</p> <ol style="list-style-type: none"> <li>11. It Pays to Keep Clean.</li> </ol>		<p>Concept of good appearance as influenced by good habits of living. Value of good appearance for success and popularity.</p> <ol style="list-style-type: none"> <li>14. Making the Most of Your Appearance or What Others See.</li> </ol>

**MATERIAL BY GRADES.****TWO SAMPLE UNITS.****THE MAKING OF AN ATHLETE.**

## GENERAL STATEMENT OF OBJECTIVES.

In this fifth grade unit we can make use of the child's awakening interest in sports' figures and events by using this interest as an approach to obtain the following objectives:

1. Creating an interest in good health practices by providing the child with a goal.
2. Providing the child with a knowledge and understanding of the health practices which makes a sound and healthy body.
3. Creating a desire to emulate the athlete's desirable mental and social traits such as teamwork, good sportsmanship and self-control.

## POSSIBLE APPROACHES.

The work of this unit may be motivated by

1. Displaying pictures of current sports' figures such as Shirley May France (swimming), Joe DiMaggio and Ted Williams (baseball), Sonja Henie (skating), or local high school and college athletic stars, or of current sports events such as the 1949 World Series.
2. Reading and telling stories of well-known athletes of past and present such as:  
 LOU GEHRIG—BOY OF THE SANDLOTS, Guernsey Van Riper, Jr.  
 Bobbs Merrill Co.  
 LIFE OF BABE RUTH AS TOLD TO BOB CONSIDINE  
 THE PRIDE OF THE YANKEES—THE STORY OF LOU GEHRIG  
 Magazine Enterprises Inc.
3. Showing movies based on the lives of athletes, such as  
 THE PRIDE OF THE YANKEES  
 BABE RUTH'S STORY  
 THE STRATTON STORY

## FORMULATION OF PROBLEMS.

Among the problems to be raised and discussed after investigation are

1. The qualifications of an athlete.  
 The daily schedule of an athlete including a healthful diet, sufficient rest, adequate exercise, cleanliness and correction of physical defects. Reasons for this schedule
2. Other people who follow schedules.  
 Students at Annapolis and West Point.  
 Men in the armed forces.  
 Student nurses and airplane hostesses.
3. The child's need of a daily schedule; what it is
4. The qualifications of a winning team.  
 Physical fitness.  
 Good sportsmanship (team play, dependability, self-control, consideration of the rights of others, being a good loser).

5. Safety precautions taken by athletes such as
  - Proper equipment and its use.
  - Thorough knowledge of the game.
  - Following the rules of the game.
6. Safety precautions taken by the children, such as
  - Selection of a suitable playground (emphasize the danger of sandlot games).
  - Need of supervision.
  - Proper equipment.

#### COLLECTION AND EVALUATION OF DATA.

The activities needed to answer the problems raised.

1. Collect pictures illustrating athletic skills.
2. Interview a local athlete (a small committee).
3. Ask local athlete or coach to discuss the health practices of the team.
4. Write a class letter to an athlete requesting information on his or her training table.
5. Through teacher-pupil planning form a number of committees to investigate the lives and training of favorite athletic heroes or heroines.
6. Have class devise a daily training schedule for themselves and adopt a method of self-checking and keeping score.
7. Use slides, "movies", and film-strips to illustrate the making of an athlete.
8. Make a class book "The Making of an Athlete".
9. Collect books and periodicals that include stories, real or fictional, of athletes, such as TRAVELING NEW TRIALS, Lyons and Carnahan. PEOPLE AND PROGRESS, Scott, Foresman. STORY TREASURES, Macmillan.
10. Have class reports on research concerning athletes.

#### CULMINATING ACTIVITIES.

To finish the unit, arrange for one or more of the following:

1. Produce a play or puppet show illustrating good athletic practices.
2. Organize class teams in volley ball, baseball, or softball.
3. Make scrapbooks.
4. Integrate with this unit
  - Language Arts—such as committee reports, letters to athletic stars and creative stories.
  - Creative Art—illustrate popular athletic activities.
  - Music—songs relative to sports and listen to recordings of safety songs (Songs of Safety by Irving Caesar).
  - History—study of Olympic Games, Tournaments of the Medieval Era, and games of Colonial Times.
  - Geography—read about sports in different lands.

#### SUGGESTIONS FOR EVALUATION.

To evaluate the results of this unit notice if there is marked improvement in health

practices and attitudes by means of observation, surveys, questionnaires, check lists, and health records.

#### REFERENCES.

##### **Health.**

Charters, Smiley and Strong. LET'S BE HEALTHY. New Health and Growth Series. Boston: Macmillan Company.

Jones, Morgan and Landis. KEEPING HEALTHY. The Road to Health Series. New York: Laidlaw Brothers.

Shacter and Bauer. YOU. Health and Personal Development Series. New York: Scott, Foresman and Company.

Wilson, Pryor, and Almack. GROWING HEALTHFULLY. American Health Series. New York: The Bobbs Merrill Company.

##### **Reading and Literature.**

Gates and Ayer. LET'S GO AHEAD. Boston: The Macmillan Company.

Gates and Ayer. LET'S TRAVEL ON. Boston: The Macmillan Company.

Gray and Arbuthnot. DAYS AND DEEDS. New York: Scott Foresman Company.

Gray and Arbuthnot. PEOPLE AND PROGRESS. New York: Scott Foresman Company.

Hildreth, Felton, Meighan and Pratt. TODAY AND TOMORROW. Philadelphia: John C. Winston Company.

Molen and Stein. THE BRAVE AND THE FREE. Boston: D. C. Heath and Co.

Spencer and Fritschler. TRAVELING NEW TRAILS. New York: Lyons and Carnahan.

Theisen and Bond. STORY TREASURES. Boston: Macmillan Company.

This unit was prepared in Malden by a group of fifth grade teachers under the direction of Dr. Mary E. Spencer, Director of Health Education.

## **GRADE 6.**

### **UNIT: FRIENDS OR ENEMIES?**

#### GENERAL STATEMENT OF OBJECTIVES.

In the upper elementary grades particularly, children are interested in scientific material more than in other types of health work. This fact is true partly because they enjoy the more advanced subjects and partly because the scientific knowledge gives decisive answers as to **why** certain practices are helpful or harmful. The mystery of why certain bacteria may not be seen, even with powerful microscopes, and such questions as whether or not bacteria are ever useful, arouse much interest. Any unit which helps to make meaningful the rules of healthful living and to develop more fully an appreciation of the wonders of natural and man-made objects is a worth-while activity.

#### POSSIBLE APPROACHES.

1. Several magnifying glasses were placed on the table, and pictures of bacteria were displayed. The pupils' questions about the lenses led to a discussion of the fact that some boys and girls had used them to study very small plants that sometimes grow on stale bread,



fruit, or other materials. (Molds). But, the class was told, there were some plants so small they could not be seen, even with our lenses. The class guessed that the small plants were germs or bacteria, and recalled that a microscope would be necessary if we were to see them. The fact that some bacteria could not be seen even with the use of a microscope led to much discussion and a desire to read about the subject.

2. On another occasion, the amusing poem, "Mumps", by Elizabeth Maddox Roberts, started a discussion about the causes of disease and the reason that some people do not become ill. The study of bacteria followed.

3. Pictures of scientists in their laboratories or of the early lensmakers started a discussion about the uses of lenses when objects near at hand are to be examined.

#### FORMULATION OF PROBLEMS. (PLANNING)

The following questions were suggested by the class:

**What Bacteria Are.** Can we see and feel them? How big are they? Do they have legs or leaves and roots? Do they have any taste?

Have they any color? Are there different kinds?

**Discovery.** Where, when, and by whom were they first discovered?

**Environment.** Where do they live? Are they in water? Can they be strained out of water? Are they in our blood? In what parts of the world do they live?

**Growth.** What do they need in order to grow? Do they grow larger? How do they grow into more bacteria? How many are there in a "bunch" (or colony)?

**Travel.** How do they travel?

**Danger or Usefulness.** Are they harmful? Are they useful?

#### ACTIVITIES. (RESEARCH)

The class divided the problems into groups, and chose topics of special interest to study, so that committees were formed to do reference work on related subjects. The children took part in the following activities:

##### **Activities for Collecting Data.**

Reading in health, science, and reading books to solve special problems.

Reading about the health heroes.

Studying pictures of bacteria or of scientists who contributed to our knowledge of bacteria.

Outlining material to present to the committees and to the class.

Figuring the number of bacteria which might grow from one in a period of a few hours, provided that conditions for growth were perfect.

Bringing to school and discussing decayed wood.

Learning new spelling and vocabulary words needed to make the meaning of the material clear.

##### **Activities for Presenting Information.**

Giving short talks on chosen subjects.

Participating in debates about the use or dangers of bacteria.

Composing group skits to use in an assembly.

Learning to manipulate puppets to use in the assembly.

Writing paragraphs to explain a chosen problem.

Sketching and explaining diagrams of bacteria, or showing pictures of the discoverers of bacteria.

Sketching, lettering, and presenting posters to explain the rules of good health so that people may avoid the effects of harmful bacteria.

### **Recreational Activities.**

Singing songs related to the out-of-doors, and to exercise.

Reading humorous poems relating to the subject of bacteria.

Reading stories about the race for antitoxin, etc.

Acting in short plays in the classroom.

Manipulating puppets.

### **CULMINATING ACTIVITY.**

Assembly Program for Grades IV to VI.

Introductory Talk: Our Unit by "A Puppet".

Reading of Poem: "Mumps". (Elizabeth Maddox Roberts) by A Pupil.

Original Skits: by Pupil Groups

Leeuwenhoek's Discovery.

A Modern Laboratory.

Song of the Out-of-Doors: "Hiking". by The Class.

Description of Sketches: Three Kinds of Bacteria. by 5 pupils.

How One Bacterium Divides.

Picture of Leeuwenhoek.

Debate: Are Bacteria Ever Helpful? by 2 Pupils.

Reading of Poem: "Miss T." by A Pupil.

Original Skits: Drinking Brook Water. by Pupil Groups.

Schoolroom Scene (Discussion of facts learned).

Reading of Poem: "Strictly Germproof" (Arthur Guiterman) by "A Puppet".

Song: "Sun Chant" by The Class.

Concluding Talk: by "A Puppet".

### **EVALUATION.**

As a result of the unit, the following outcomes were noted:

Increased ability to locate information.

Better oral reading, necessitated by the use of the puppets.

Clearer speech, in preparation for the assembly.

Beginning skills in making brief outlines of material studied.

More co-operation by this new class when working in groups.

Initiative in making suggestions.

Much interest in pure drinking water.

The following test was taken and passed by all but one pupil. There were more "excellent" and "good" papers than "fair" records of achievement. Even a non-reader received a "B" when the questions were read to him for his consideration.

After hearing our assembly program, one of the teachers remarked, "You've taken a heavy subject and made it light."

## SPELLING OR VOCABULARY WORDS.

## Easy List

germs	illness	doctor
heal	sickness	evil
healthy	pure	decay
heroes		

## More Difficult List

bacteria	quarantine	superstition
microscope	pasteurize	superstitious
health	sterilize	advantage
science	harmless	ferment
scientists	disease	nitrogen
laboratory	contagious	dangerous
infect	wisdom	alert
immune	spirits	co-operate

**Multiple Choice.** Please copy only the LETTER which comes BEFORE the BEST answer.

1. Bacteria are tiny—a. animals; b. plants; c. corpuscles; d. atoms.
2. Many bacteria are—a. blue; b. red; c. colorless; d. green.
3. Bacteria were first seen by—a. Leeuwenhoek; b. Pasteur; c. Galileo; d. an Englishman.
4. The man who discovered bacteria lived in—a. France; b. the United States; c. Great Britain; d. Holland.
5. Bacteria may not be seen without—a. glasses; b. telescope; c. microscope; d. camera.
6. Bacteria live—a. hardly anywhere; b. in five countries; c. on our hands; d. almost everywhere.
7. In order to grow, bacteria need—a. fire; b. ice; c. food; d. dirt.
8. Bacteria grow best in a place that is—a. cold and moist; b. dark and cool; c. moist and warm; d. hot and dry.
9. One bacterium increases in number—a. every day; b. every week; c. each few minutes; d. each year.
10. Bacteria increase in number by—a. dividing in half; b. growing bigger; c. holding onto dust; d. swimming.
11. There are—a. 3; b. 7; c. 4; d. 10—different types of bacteria, according to general shape.
12. Germs which are round are called—a. microbes; b. corpuscles; c. spirilla; d. cocci.
13. Rod-shaped bacteria are called—a. bacilla; b. protozoa; c. atoms; d. harmful bacteria.
14. a. Most; b. a few; c. all; d. no—bacteria are harmful.
15. Waste matter is changed to rich soil by—a. leaves; b. roots; c. algae; d. bacteria.
16. Bacteria help in the manufacture of—a. milk; b. alcohol; c. fruit juices; d. butter.
17. Bacteria in the roots of certain plants make—a. oxygen; b. moisture; c. nitrates; d. irrigation—which enrich(es) the soil.
19. Harmful germs in water may be killed by—a. boiling the water; b. freezing it; c. keeping it in the refrigerator; d. keeping it covered.
20. People may often avoid being ill by—a. sitting in the sun; b. swimming; c. following the rules of good health; d. hiking.

## BIBLIOGRAPHY.

**Science.** (In order of difficulty, with easiest books first)

Grade IV. Beauchamp, Wilbur L.; Williams, Mary M.; and Blough, Gleen O. DISCOVERING OUR WORLD. Science for the Middle Grades, Book I. New York; Scott, Foresman & Co., 1947. (224 pp.) pp. 160-171; pp. 171-174.

Grade V. Craig, Gerald S.; and Johnson, Goldie M. OUR EARTH AND ITS STORY. Boston: Ginn and Co., 1932. (462 pp.) pp. 391-421.

Grade VI. Frasier, George Willard; MacCracken, Helen D.; and others. HOW AND WHY DISCOVERIES. The Scientific Living Series. The How and Why Science Books. Syracuse: The L. W. Singer Co., 1949. (364 pp.) pp. 205-208; 335-374.

**Health.** (Easiest books first)

Grade V. Brownell, Ireland, and Giles. EVERYDAY LIVING. Health and Safety Series.

Charters, W. W.; Smiley, Dean F.; and Strang, Ruth M. WISE HEALTH CHOICES. Health and Growth Series, Book III. New York; Macmillan Co., 1935. (212 pp.) pp. 142-148; pp. 148-157; pp. 163-165.

Wilson, Charles C.; Pryor, Helen B.; and Almack, John C. HEALTH AT WORK AND AT PLAY. The American Health Series, Grade 5. New York: The Bobbs-Merrill Co., pp. 143-153.

Grade VI. Charters, W. W.; Smiley, Dean F.; and Strang, Ruth M. HABITS, HEALTHFUL AND SAFE. New Health and Growth Series, Grade 6. New York: The Macmillan Co., 1945. (277 pp.)

Charters, W. W.; Smiley, Dean F.; and Strang, Ruth M. HEALTH PROBLEMS. Health and Growth Series, Book IV. New York; The Macmillan Co., 1935. (231 pp.) pp. 181-152.

Turner, C. E.; Melchior, Juanita D.; and Curl, Grace V. CLEANLINESS AND HEALTH PROTECTION. Boston: D. C. Heath & Co., 1941. (244 pp.)

Wilson, Charles C.; Pryor, Helen D.; and Amack, John C. GROWING HEALTHFULLY. The American Health Series, Grade VI. New York: The Bobbs-Merrill Co., 1948. pp. 178-180; pp. 183-184.

**Reading and Literature.**

Haffard, Grace Thompson; Carlisle, Laura Mae; and Ferris, Helen. MY POETRY BOOK. Philadelphia: The John C. Winston Co., 1948. (504 pp.) page 13—"Mumps".

Meine, Franklin J., and Warren, Harris Gaylord. GREAT LEADERS: Men and Women Who Influenced Their Times. Wonder Books Series. Chicago: University of Knowledge, Inc., 1938. pp. 298-306.

Wilson, Howard E.; Wilson, Florence H.; and Erb, Bessie P. RICHER WAYS OF LIVING. Our Ways of Living Series. Boston: American Book Co., 1937. (666 pp.) pp. 219-315.

Yoakam, Gerald; Veverka, M. Madeline; and Abney, Louise. FROM EVERY LAND. Laidlaw Basic Readers, Grade VI. New York: Laidlaw Brothers, Inc., 1941. (448 pp.) p. 234 and pp. 198-206.

**Music.**

Glenn, Mabelle; Leavitt, Helen S.; Rebman, Victor L. F.; and Baker, Earl L. TUNES AND HARMONIES. The World of Music Series: enlarged edition. Boston: Ginn and Co., 1943. (192 pp.) p. 30 and p. 46.

This unit was developed in the Training School of the State Teachers College at Bridge-water in September, 1949, by Helen Hulsman, Teacher, Grade 6.

**GRADE 4.****ABSTRACT CHART.**

SCOPE: Continuation of cycle plan, i.e., concentration of direct teaching in selected fields.  
Incidental teaching in all fields as need arises.

CHIEF MOTIVATION: Health for GROWTH and PLAY.

GENERAL EMPHASIS: Broadened concepts and increased self-direction of habits.

AREAS OF GROWTH	MAJOR FIELDS	EMPHASIS	A FEW SUGGESTED UNITS
ORGANIC FUNCTIONING	EATING	Increased detail as to necessary daily foods especially for building bones, muscles, teeth, and producing energy. Expanded concept of daily meals, especially noon lunch. Beginning of special study of milk as a food.	<ol style="list-style-type: none"> <li>1. Noon Lunch at School.</li> <li>2. Stoking Our Body Engines.</li> <li>3. Learning More About Milk.</li> <li>4. A Pleasing Smile.</li> <li>5. My Growth Chart.</li> </ol>
	ELIMINATION	Concept that waste materials result from the production of energy. Necessity of proper elimination of body wastes.	(Taught incidentally in connection with other units, i.e., Stoking Our Body Engines.)
ADAPTATION TO PHYSICAL ENVIRONMENT	PROTECTION AGAINST DISEASE	Concept of some means by which disease is spread. Increased sense of responsibility for others.	<ol style="list-style-type: none"> <li>6. Away With the Fly.</li> <li>7. Keeping Your Cold to Yourself.</li> <li>8. Unseen Enemies.</li> <li>9. Community Health Services.</li> <li>10. Healthful Surroundings.</li> </ol>
ADAPTATION TO SOCIAL ENVIRONMENT	PERSONAL APPEARANCE AND GROOMING.	Broadened concepts of importance of cleanliness and good appearance; especially in care of the teeth.	<ol style="list-style-type: none"> <li>11. It Pays to Keep Clean.</li> </ol>

For detailed outline, see following pages.

For opportunities for integration, see outlines of other subjects, particularly Science and Social Studies.

## GRADE 4. OVERVIEW CHART.

AREAS OF GROWTH	MAJOR FIELDS	KNOWLEDGE AND UNDERSTANDING	ATTITUDES AND APPRECIATION
ORGANIC FUNCTIONING	EATING	<ol style="list-style-type: none"> <li>1. Knows the right eating habits for children of this age. (See habits and skills)</li> <li>2. Knows that good bones and muscles are necessary for play.</li> <li>3. Knows that some foods build and repair muscles; some of these are meat, fish, eggs, and milk.</li> <li>4. Knows that some foods build bones and teeth; some of these are milk, fruits, cereals, and vegetables.</li> <li>5. Knows that energy is necessary for play.</li> <li>6. Knows that some foods give energy; some of these are butter, bacon, fruit, vegetables, whole-grained bread, and cereals.</li> <li>7. Knows that plain milk is more wholesome than milk that is artificially flavored.</li> <li>8. Knows what constitutes a good noon lunch at school.</li> <li>9. Knows that good teeth are important for proper chewing of food.</li> <li>10. Knows that there are biting, tearing, and chewing teeth.</li> <li>11. Knows that a child of his age usually has 20 of the 32 permanent teeth (12 chewing, and 8 biting).</li> <li>12. Knows that if teeth are neglected, they may have to be pulled.</li> <li>13. Knows that the best way to care for teeth is to eat right foods; visit dentist at least twice a year; keep teeth clean.</li> </ol>	<ol style="list-style-type: none"> <li>1. Wants to eat foods which will help him to grow, keep well, and have energy for play. (See list of habits).</li> <li>2. Is not fussy or prejudiced about foods.</li> <li>3. Is interested in growing chart.</li> <li>4. Enjoys eating in attractive surroundings.</li> </ol>
	ELIMINATION	<ol style="list-style-type: none"> <li>1. Knows that bowels should be emptied at regular time.</li> <li>2. Knows the correct terms for expressing needs of elimination.</li> <li>3. Knows that right foods and proper exercise are better than drugs in regulating elimination.</li> </ol>	<ol style="list-style-type: none"> <li>1. Is willing to take time to have a bowel movement.</li> <li>2. Is matter-of-fact about attending to elimination.</li> </ol>

SKILLS AND HABITS	A FEW SUGGESTED UNITS	SUGGESTED ACTIVITIES
<ol style="list-style-type: none"> <li>1. Asks for foods that help children to grow, keep well, and have energy for play, which are plain milk, dark bread, cereals, vegetables, eggs, fish, meat, and butter; <b>AND eats these foods when they are served.</b></li> <li>2. Eats simple sweets only, and mainly at the end of a meal.</li> <li>3. Drinks water frequently, and avoids tea, coffee, and soft drinks.</li> <li>4. Eats only fruit, milk, or crackers for between-meal lunches if necessary.</li> <li>5. Chooses plain milk in preference to artificially flavored milk.</li> <li>6. Takes small bites and chews food thoroughly.</li> <li>7. Sits at table and takes adequate time for meals.</li> <li>8. Drinks slowly.</li> <li>9. Eats only at regular times and eats 3 meals daily.</li> <li>10. Does not drink anything with food in the mouth.</li> <li>11. When overheated, avoids iced drinks.</li> <li>12. Goes to the dentist at least twice a year.</li> <li>13. Brushes teeth at least twice daily.</li> <li>14. Chews daily some hard foods which exercise the teeth and gums—raw carrots, celery, toasts, crusts, etc. (No other means of exercising teeth is necessary.)</li> </ol>	<ol style="list-style-type: none"> <li>1. Noon Lunch at School Lunch boxes School cafeteria Buying lunches elsewhere Picnic lunches</li> <li>2. Stoking Our Body Engines. See outline on following pages.</li> <li>3. Learning More About Milk. Compare milk with other drinks. Compare plain milk with artificially flavored.</li> <li>4. A Pleasing Smile. Building good teeth Keeping teeth clean. Protecting teeth against decay and injury.</li> <li>5. My Growth Chart The things that help us grow. Measuring growth in weight and height.</li> </ol>	<ol style="list-style-type: none"> <li>1. Using pictures of foods, practice planning and selection of good noon-day lunches.</li> <li>2. Demonstrating the packing of a lunch for school or picnic.</li> <li>3. Copying and exchanging recipes for good sandwich fillings and making them at home.</li> <li>4. Preparing a sandwich filling at home using school recipe, and bringing in the lunch kit.</li> <li>5. Giving a talk on the topic, "How Foods Help Us to Play Games Well."</li> <li>6. Making a list on blackboard of drinks children in class use, comparing plain milk with others on list.</li> <li>7. Figuring gains in height and weight since last weighing and since the first of the year. Making graphs showing these gains.</li> <li>8. Comparing foods of people of other lands with ours.</li> <li>9. Preparing an exhibit for parents on school lunches.</li> <li>10. Watching films on food and food production.</li> </ol>
<ol style="list-style-type: none"> <li>1. Goes to toilet at a regular time each day for a bowel movement.</li> <li>2. Reports to Mother if bowels do not move daily.</li> <li>3. Has control of bladder.</li> </ol>	See Unit # 2	

**GRADE 4. OVERVIEW CHART. (continued)**

AREAS OF GROWTH	MAJOR FIELDS	KNOWLEDGE AND UNDERSTANDING	ATTITUDES AND APPRECIATIONS
ADAPTATION TO PHYSICAL ENVIRONMENT	PROTECTION AGAINST DISEASE	<ol style="list-style-type: none"> <li>1. Knows right habits for protection against disease for a child of this age. (See list of habits and skills).</li> <li>2. Knows how to recognize colds in self and others.</li> <li>3. Knows how to blow nose properly.</li> <li>4. Knows why hands and objects should be kept away from mouth.</li> <li>5. Knows flies carry dirt and germs.</li> <li>6. Knows how to use a bubbler.</li> <li>7. Knows value of hospitals and clinics.</li> <li>8. Knows important times to wash hands.</li> <li>9. Knows that spitting on floors and sidewalks may spread disease.</li> </ol>	<ol style="list-style-type: none"> <li>1. Enjoys cleanliness in regard to person, food equipment, as listed under habits and skills.</li> <li>2. Co-operates with those caring for sickness.</li> <li>3. Observes quarantine willingly.</li> <li>4. Is willing to stay home when not feeling well.</li> <li>5. Dislikes having flies around.</li> <li>6. Co-operates when having medical or dental care.</li> <li>7. Is able to observe precautions without feeling fear.</li> <li>8. Wants to have clean, sound teeth.</li> </ol>
ADAPTATION TO SOCIAL ENVIRONMENT	PERSONAL APPEARANCE AND GROOMING	<ol style="list-style-type: none"> <li>1. Knows that general cleanliness and neatness make us more attractive to others.</li> <li>2. Knows how to keep clean and neat.</li> <li>3. Knows how to take a bath under varying conditions.</li> <li>4. Knows how to brush teeth.</li> <li>5. Knows how to care for tooth brush.</li> </ol>	<ol style="list-style-type: none"> <li>1. Takes responsibility for cleanliness and personal appearance.</li> <li>2. Is willing to make himself clean and attractive at suitable times.</li> <li>3. Is willing to take baths.</li> <li>4. Likes feeling and appearance of clean teeth.</li> </ol>



SKILLS AND HABITS	A FEW SUGGESTED UNITS	SUGGESTED ACTIVITIES
<ol style="list-style-type: none"> <li>1. Does not taste or take bites of other people's food.</li> <li>2. Washes hands before eating and after toilet.</li> <li>3. Does not eat food that has dropped on the floor.</li> <li>4. Uses bubbler correctly.</li> <li>5. Does not eat unknown berries and leaves.</li> <li>6. Uses own glass, cup, straw, and silver.</li> <li>7. Keeps hands away from eyes, nose, mouth, and ears.</li> <li>8. Uses own clean face cloth, towel, and tooth brush.</li> <li>9. Uses clean handkerchief or tissue to keep nose clean.</li> <li>10. Covers nose and mouth when coughing or sneezing.</li> <li>11. When sick, keeps away from playmates.</li> <li>12. Keeps away from those who are sick.</li> <li>13. Reports to an older person when not feeling well.</li> <li>14. Does not touch strange animals.</li> <li>15. Helps keep flies out of building by closing screen doors.</li> <li>16. Helps protect food from flies.</li> <li>17. Keeps outdoor toilet seats closed.</li> <li>18. Does not drink water from unknown sources.</li> <li>19. Washes raw fruit before eating.</li> <li>20. Does not wet fingers in mouth to turn pages.</li> <li>21. Visits doctor and dentist at least once a year.</li> </ol>	<ol style="list-style-type: none"> <li>6. Away With the Fly!</li> <li>7. Keeping Your Cold to Yourself. <ol style="list-style-type: none"> <li>a) Taking care of yourself when you have a cold.</li> <li>b) Protecting other people.</li> </ol> </li> <li>8. Unseen Enemies. See detailed outline on following pages.</li> <li>9. Community Health Services. Milk supply. Water supply. Keeping food clean. Controlling disease.</li> <li>10. Healthful Surroundings. <ol style="list-style-type: none"> <li>a) At school.</li> <li>b) At home.</li> <li>c) What I can do to improve them.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Obtaining quarantine cards and discussing the purpose of quarantine.</li> <li>2. Making a chart for self-checking on some bad habit which should be overcome (chewing pencil, sucking fingers, biting nails, etc.)</li> <li>3. Dramatizing visit of doctor to patient with cold or common communicable disease.</li> <li>4. Participating in fly control. (See unit—<b>Away With the Fly.</b>)</li> <li>5. Sending a committee to Board of Health for information about public health services.</li> </ol>
<ol style="list-style-type: none"> <li>1. Keeps belongings tidy.</li> <li>2. Arranges clothes neatly when he goes to bed.</li> <li>3. Hangs up own outside wraps.</li> <li>4. Takes a bath at least twice a week when possible.</li> <li>5. Brushes teeth at least twice a day.</li> <li>6. Keeps nails clean.</li> <li>7. Washes hair regularly, at frequent intervals.</li> <li>8. Wears clean underclothes.</li> <li>9. Comes to school neat and clean.</li> </ol>	<ol style="list-style-type: none"> <li>11. It Pays to Keep Clean. See detailed outline on following pages.</li> </ol>	<ol style="list-style-type: none"> <li>1. Conducting morning inspection.</li> <li>2. Making a list of characteristics admired in a 4th grader that have to do with cleanliness and neatness.</li> <li>3. Self-checking against above list and making plans for improvement.</li> <li>4. Discussing how to select, use, and take care of tooth brush.</li> </ol>

**GRADE 4.****UNIT: STOKING OUR BODY ENGINES.**

## GENERAL STATEMENT OF OBJECTIVES.

For fourth grade a detailed and technical knowledge of foods is unnecessary. It is enough if the child understands in a general way what functions foods have in the body, what foods should be abundant in a good diet, and what habits of eating will best promote the growth and "pep" which he himself desires.

## POSSIBLE APPROACHES.

The noon-day lunch if this is eaten at school.

Pictures of children engaged in sports and games. What gives them the energy for this activity?

Discussion of foods for campers and explorers.

The penny spending habit, if this is prevalent.

## FORMULATION OF PROBLEMS. (Planning)

What does the word "energy" mean?

How does the energy of the human body compare with the power of a machine?

What gives the motor of a machine power?

What gives the body plenty of energy?

Why do boys and girls want to stoke their body engines with fuel?

What are good foods for boys and girls?

What are some good noon lunches for boys and girls at home or at school?

What rules about eating would help boys and girls to grow best and have the most pep?  
(See lists of habits, etc.)

## COLLECTION AND EVALUATION OF DATA. (Research Activities)

Bring recipes from home for suitable dishes.

Read health books and other books. Use dictionary.

Collect pictures of good foods for children. Mount these and use them for planning meals.

Prepare a demonstration on the noon-day lunch, either a kit lunch or a lunch eaten at home, depending upon problem of group, including serving, cleanliness, and choices.

Prepare a short list of good eating habits for children from suggestions of whole group.

See list under "Suggested Activities" in chart for additional suggestions.

Have a tour of inspection of school lunchroom, or food stores, watching for prices, sanitation, etc.

## CULMINATION ACTIVITIES.

Prepare a cookbook of favorite recipes and menus.

Have a sale of cookbooks and menus.

Invite parents to school for a program to show what has been learned about foods.

Have a luncheon party or a picnic, illustrating what has been learned.

## SUGGESTIONS FOR EVALUATION.

Test for factual knowledge.

Observe nature of noon lunches or recess lunches for signs of permanent improvement.

If some "new" foods such as carrot sticks have been added to lunches as a result of the unit, observe attitude toward these foods after unit is over. Observe penny spending habits.

#### **GRADE 4.**

#### **UNIT: AWAY WITH THE FLY!**

If possible, this unit should be studied in May when elimination of one fly means elimination of hundreds of possible progeny.

The objectives of the unit are that children shall:

Develop a consciousness of the house fly as a carrier of dirt and disease;

Become acquainted with the common methods of control of flies used in the home and community;

Become aware of the ways in which a child may help to control flies.

#### **POSSIBLE APPROACHES.**

Initiate the unit when control of flies in the classroom or during the lunch period becomes a need.

Display a much enlarged picture of the common house fly or locate such a picture in books. Discuss particularly the structure of the flies and the way they readily carry dirt and germs.

Through a general interest in insects, perhaps in nature study, isolate the problem of the common fly and its relation to man.

#### **FORMULATION OF PROBLEMS. (Planning)**

What does a fly really look like? How does the structure of a fly make him an especially good carrier of dirt and germs? In what way do flies do us harm?

Where do flies especially like to be? Does this make them pleasant guests when they come into our homes?

Can we keep flies out of our houses, schools, stores, etc? How can we protect foods from flies that do get in?

How can we keep flies from breeding?

#### **COLLECTION AND EVALUATION OF DATA. (Research Activities)**

Use any books and magazines you may have to find the answers to the questions above.

Make a cartoon or chart showing the places a fly often visits before he comes into your home.

Bring to school samples of the different ways to attack flies (swatters, fly paper, fly traps, etc.).

Check the screens in the windows and doors of your home to see if they are tight enough so flies cannot get in.

Find out what the Board of Health in your community does to get rid of fly breeding places.

Study the yards and alleys in your neighborhood and locate fly breeding places. Can you do anything to clean up these places?

Find out how to make a screen fly trap. Suggest some places where fly traps might be placed.

Visit a market and study all the ways in which foods are protected from flies. How can you protect foods from flies in your own home?

In rural districts with outdoor toilets, check to see if toilet is screened and tight against flies; and if children do their part to keep the doors closed and seat covers down.

**CULMINATING ACTIVITIES.**

Write a composition on the subject "How I Can Help to Protect My Home from Flies."

Prepare a talk on the subject: "Getting Rid of the Places Where Flies Breed."

Conduct a "Swat the Fly" campaign. Make posters asking other grades to help you "swat the fly".

Prepare a talk to give to your class telling about some fly breeding places that **you** have cleaned up.

**SUGGESTIONS FOR EVALUATION.**

Do children close doors more carefully?

Is there evidence of desiring to keep flies away from lunch?

Were a number of fly-breeding places cleaned up?

Are children interested in keeping flies away from the school-room and eliminating those that do get in?

Is there evidence that the children have developed an awareness of the problem of flies in the home?

**GRADE 4.****UNIT: UNSEEN ENEMIES.****GENERAL STATEMENT OF OBJECTIVES.**

The "Unseen Enemies" of this unit are, of course, disease germs. A child of this age is expected to have only a very elementary concept of germs, but he should know that germs are plants and animals too tiny for us to see without a microscope; that some of them are disease germs, and can make us sick if they enter our bodies.

The object of this unit is to relate this concept to some familiar situations in the child's life and to encourage him in forming suitable protective habits in regard to them.

**POSSIBLE APPROACHES.**

This unit might be initiated when new pencils are distributed; when a real or imaginary hike or picnic is being planned; when the habit of putting fingers around mouth becomes a problem; when a strange dog invades the school yard; when the proper use of the bubbler is under consideration; or in any one of the countless situations related to using one's own things and keeping all unsuitable things away from the mouth.

**FORMULATION OF PROBLEM. (Planning)**

What are germs?

Why are some germs called our "unseen enemies"?

Where are some of the favorite places where germs live?

How do germs get into the body?

What are some of the ways by which we can prevent disease germs from getting into our bodies?

**COLLECTION AND EVALUATION OF DATA. (Research)**

Read in health books, other books, and magazines.

Collect pictures related to problems.

Make a plan for caring for the pencils in your room so each child will always get his

own. (One plan is to make a box with as many holes in the top as there are people in your room. Mark each hole with a name and place each pencil in a hole.)

Make a list of all the things that you should keep for your own use and never borrow from other people.

Check yourself for one day and see how many times you catch yourself with your hands around your face. Try hard for several days to get over this habit, then check yourself again and see if you have improved.

Make up some slogans that you can put on the bulletin board to help you remember to use your own things and to keep things away from your mouth.

Plan a demonstration on how to wash your hands properly and tell why you should keep your hands clean and when you should wash your hands.

Tell what safe water is, and why the water in streams and ponds is not safe.

Show how to use a bubbler properly. Tell about and show good ways of drinking safe water when there is no bubbler (clean individual folding cups, individual paper cups, individual paper cups made from a piece of paper, etc.).

Find out how the water in your town is made safe.

Find out whether the water at your favorite picnic place is safe.

Plan a demonstration to show how you would wash apples, pears, plums, (or other fruits that you eat raw), or carrots, celery (or other vegetables that you eat raw) before packing them into a lunch box for school or a picnic. (Raw vegetables may be wrapped in a piece of wet paper to keep them crisp.)

Write a story about why you should keep your own pet clean, and why you should not touch strange animals.

#### CULMINATING ACTIVITIES.

Arrange a bulletin board with slogans and pictures.

Give demonstrations.

Show and explain collections.

Read best compositions to class, etc.

If a school picnic is in prospect, this is an excellent time to practice what has been learned concerning proper arrangements for food and drink.

#### SUGGESTIONS FOR EVALUATION.

Are children more conscious of placing hands and objects in mouth?

Is there any increase in fastidiousness about using own things?

Is the habit of borrowing less prevalent?

Is the attitude toward personal fastidiousness matter-of-fact enough so that no child is self-conscious in practicing it?

### GRADE 4.

#### UNIT: IT PAYS TO KEEP CLEAN.

##### GENERAL STATEMENT OF OBJECTIVES.

Fourth grade children are not generally impressed with the virtue of cleanliness and neatness. When a teacher undertakes such a unit of instruction, she should recognize that the child's natural impulses are not very often in harmony with what she hopes to accomplish. The object of this unit is to make cleanliness attractive to the child as a means of attaining goals which he does recognize as desirable.

It should also be borne in mind that cleanliness is in large part a home problem. Cooperation of parents should be sought, and every effort must be made to avoid embarrassment of the child with poor home back-ground.

#### POSSIBLE APPROACHES.

Display of pictures of children happily engaged in group activity.

Discussion of traits that make you a welcome member in a play group, at a party, in your club, in your school **group**.

#### FORMULATION OF PROBLEMS. (Planning)

What does "respect" mean?

What does it mean to have "self respect"?

What does it mean to have others respect you?

What does it mean to be popular?

How does keeping yourself and your things clean and neat help to increase your self-respect and your popularity?

What rules for keeping clean and neat should fourth graders be able to practice?

What things do fourth graders need to help them to practice these rules?

#### COLLECTION AND EVALUATION OF DATA. (Research)

Use your health books and other books, including the dictionary.

Make a list of the rewards that come to people who are clean and neat.

Collect all the things people need to help them keep clean and neat (basin, soap, towel, wash cloth, tooth brush, tooth powder, comb, brush, nail file, clothes brush, shoe brush). Discuss which of these things you may share with other members of the family and which things must be used only by yourself. Discuss satisfactory substitutes for some of these things.

Find out all you can about the different ways people take baths in different countries. Find pictures if you can.

In how many different ways do people take baths right here in our country? (full tub, wash tub, shower, sponge, etc.) Discuss these. Collect pictures.

Discuss how your outside wraps should be cared for at home and at school; how your clothes should be cared for at night; how your playthings at home and your desk at school should be cared for.

Make a list of the things you should remember to do when you go to play in another child's home.

People cannot always keep clean when they are playing or working. If you wear proper play or work clothes, and if you always clean up when you get through, it is often all right to get dirty.

Make a list of the times when fourth graders should try to look neat and clean.

Devise a morning inspection plan.

Learn the characteristics of a good tooth brush, and send a committee to local stores to see how cheaply you can buy a good tooth brush.

#### CULMINATING ACTIVITIES.

Give play.

Arrange bulletin board.

Give demonstrations, etc.

Carry on inspections.

Give a program for parents or for another grade showing what has been learned.

## SUGGESTIONS FOR EVALUATION.

Observe whether children continue signs of improvement concerning things they themselves can control after the unit is over: clean hands, clean nails, neat hair, neat desk, proper care of outer clothing, etc.

## REFERENCES.

- Brownell, C. L.; Ireland, A. G.; and Siegl, M. H. HAPPY LIVING. Health and Safety Series. 4th Grade. New York: Rand McNally and Company, 1937. pp. 6, 7, 39, 43, 46, 66, 85, 135, 141, 149, 150, 152, 154, 159, 166, 169, 191.
- Hahn, Mary Louise, and Winslow, C. E. A. LET'S STAY WELL. New Healthy Living Series. New York: Charles E. Merrill Co., 1938. pp. 176-182.
- Jones, Maloney, Morgan, and Landis. HEALTH TRAILS. Road to Health Series. Chicago: Laidlaw Brothers, 1949. Chapter IX, pp. 165-183.
- Wilson, Pryor, and Almack. HEALTH AT HOME AND SCHOOL. American Health Series. New York: Bobbs-Merrill Company, 1942. pp. 8-11; 35-40; 82-84.
- Wood, Thomas D., and others. MANY WAYS OF LIVING. Adventures in Living Series. New York: Thomas Nelson and Sons, 1937. Chapter XI, pp. 109-119.





**GRADE 5.****ABSTRACT OF CHART.**

SCOPE: Continuation of cycle plan, i.e., concentration of direct teaching in selected fields. (See summary below.)

Incidental teaching in all fields as need arises.

CHIEF MOTIVATION: Health for GROWTH, ATHLETICS, PERSONALITY, and CITIZENSHIP.

GENERAL EMPHASIS: Growing scientific attitudes. Increased feeling of personal responsibility as a member of the group. Simple consumer points of view. Increased emphasis on health as a means to success.

AREAS OF GROWTH	MAJOR FIELDS	EMPHASIS	SUGGESTED UNITS
ORGANIC FUNCTIONING	PHYSICAL ACTIVITY.	Increased understanding of posture and its relation to successful living. Expansion of ideas of childhood play into broader recreational concepts.	1. The Making of an Athlete. 2. How Our Community Plays. 3. Planning a Picnic. 4. Hiking and Biking. 5. Our Body Machine.
	SLEEP REST, RELAXATION, RECREATION.	Simple scientific understanding of the function of sleep. Significance of recreation as a means of relaxation.	6. Why Sleep? 7. Hobbies. (See also #1, 2, 3, and 4)
ADAPTATION TO PHYSICAL ENVIRONMENT	PROTECTION AGAINST INJURY.	Increased appreciation of bodily functions and need for their care and protection to maintain efficiency. Beginning of critical evaluation of advertising, superstitions, etc.	8. How Our Eyes and Ears Work. 9. Use and Misuse of Drugs. 10. What We should Know About First Aid. 11. What Can We Believe?
	ADAPTATION TO ATMOSPHERIC CONDITIONS.	Broadened concept of effect of climate on lives of people in other parts of the world, with adequate self-direction concerning own adaptation to climate.	12. Clothing for Every Climate. (See also #1, 3, and 4)
ADAPTATION TO SOCIAL ENVIRONMENT	RELATIONSHIPS WITH OTHERS.	Beginning awareness of simple facts of mental hygiene. Increased sense of own importance as a member of the group, especially the home.	13. Are You Good Company? 14. My Share in Making the Home. 15. Keep Your Chin Up. 16. Bringing Up Pets. (See also #1, 2, 3, 4.)

For detailed outlines, see following pages.

For opportunities for integration, see outlines of other subjects, particularly Science and Social Studies.

## GRADE 5. OVERVIEW CHART.

AREAS OF GROWTH	MAJOR FIELDS	KNOWLEDGE AND UNDERSTANDINGS	ATTITUDES AND APPRECIATIONS
ORGANIC FUNCTIONING	PHYSICAL ACTIVITY	<ol style="list-style-type: none"> <li>1. Knows that activity is necessary for the development of muscles.</li> <li>2. Knows that out-of-door sports are more beneficial than indoor.</li> <li>3. Knows that fresh air and sunshine help to develop strong bodies.</li> <li>4. Knows how to stand, sit, walk, and run correctly. (See P.E. outline.)</li> <li>5. Knows that good posture aids proper functioning of internal organs.</li> <li>6. Has a suitable repertoire of physical activities for a child of this age level. (See P.E. outline.)</li> <li>7. Knows that training helps to improve skill and endurance in athletics and to prevent athletic injuries.</li> <li>8. Knows simple facts about bone and muscle growth and how it is maintained.</li> </ol>	<ol style="list-style-type: none"> <li>1. Shows definite preference for active play out-of-doors.</li> <li>2. Recognizes that good posture is a part of movement as well as sitting and standing.</li> <li>3. Recognizes the importance of good posture for efficiency, comfort, and appearance.</li> <li>4. Admires physical fitness in others, and wants to attain it for himself.</li> <li>5. Is willing to assume responsibility for healthful living in order to attain his ambitions.</li> </ol>
	SLEEP, REST, RELAXATION & RECREATION	<ol style="list-style-type: none"> <li>1. Knows right habits for sleep and rest. (See Habits and Skills.)</li> <li>2. Knows simple processes of cell activity.</li> <li>3. Knows that activity—fatigue—rest is a normal cycle for animals and human beings.</li> <li>4. Knows that during sleep a) body activity slows down; b) worn-out cells are repaired; c) new cells are produced; d) poisons eliminated from cells; e) body produces less heat.</li> <li>5. Knows that bed covers should be light and warm.</li> <li>6. Knows how to relax.</li> <li>7. Knows ill effects of too little sleep.</li> <li>8. Has a suitable repertoire for a child at this level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Assumes responsibility for getting proper number of hours of sleep.</li> <li>2. Enjoys sleeping in a dark, well-ventilated room.</li> <li>3. Is willing to rest when tired.</li> </ol>

SKILLS AND HABITS	A FEW SUGGESTED UNITS	SUGGESTED ACTIVITIES
<ol style="list-style-type: none"> <li>1. Plays several hours out-of-doors every day except in rainy weather.</li> <li>2. Maintains good posture most of the time. (Sitting, standing, and in motion.)</li> <li>3. Engages in a variety of vigorous play activities.</li> <li>4. Engages in helpful activities around the home, such as raking, shoveling, etc.</li> <li>5. Practices skills he wishes to develop.</li> </ol>	<ol style="list-style-type: none"> <li>1. The Making of an Athlete. See Typical Units in Introduction to Chapter X.</li> <li>2. How Our Community Plays. Types of play. Space and facilities. Participation, number of people, amount of time, frequency.</li> <li>3. Planning a Picnic. See outline on following pages.</li> <li>4. Hiking and Biking. Values. Local opportunities. Adventuring Safely. Youth hostelling.</li> <li>5. Our Body Machine.</li> </ol>	<ol style="list-style-type: none"> <li>1. Listing general training habits of athletes.</li> <li>2. Studying the career of a well-known athlete.</li> <li>3. Going into training for 5th grade athletics.</li> <li>4. Working out a series of mimetic exercises based on popular sports.</li> <li>5. Making spot maps showing local play areas.</li> <li>6. Making graphs and charts showing participation in some recreational activity.</li> <li>7. Constructing models of ideal recreation spaces.</li> <li>8. Planning some kind of outing. (See unit: <b>Planning a Picnic</b>)</li> <li>9. Collecting information on youth hostelling.</li> <li>10. Planning a hiking or biking trip. (Making such a trip if possible.)</li> </ol>
<ol style="list-style-type: none"> <li>1. Has regular bedtime.</li> <li>2. Has ten hours of sleep at night.</li> <li>3. Has quiet recreation before going to bed.</li> <li>4. Sleeps in a dark, quiet, well-ventilated room.</li> <li>5. Sleeps alone when facilities permit.</li> <li>6. Undresses completely and puts on night garment.</li> </ol>	<ol style="list-style-type: none"> <li>6. Why Sleep? <ol style="list-style-type: none"> <li>a) What happens during sleep.</li> <li>b) Suitable conditions during sleep.</li> </ol> </li> <li>7. Hobbies. <ol style="list-style-type: none"> <li>a) Why we have a hobby.</li> <li>b) Types of hobbies. See Units #1, 2, 3, 4.</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Listing new terms.</li> <li>2. Studying cells under microscope.</li> <li>3. Studying one-celled animals.</li> <li>4. Watching film on the living cell.</li> <li>5. Listing and discussing suitable conditions for sleep.</li> <li>6. Practicing relaxation.</li> <li>7. Collecting material on hobbies of prominent people.</li> <li>8. Participating in a hobby club.</li> <li>9. Preparing a hobby exhibit.</li> <li>10. Making a chart of sleeping habits of various pets.</li> </ol>

**GRADE 5. OVERVIEW CHART. (continued)**

AREAS OF GROWTH	MAJOR FIELDS	KNOWLEDGE AND UNDERSTANDINGS	ATTITUDES AND APPRECIATIONS
ADAPTATION TO PHYSICAL ENVIRONMENT	PROTECTION AGAINST INJURY AND DETERRENENTS TO GROWTH	<ol style="list-style-type: none"> <li>1. Knows safety habits. (See Habits and Skills.)</li> <li>2. Knows all the rules for riding bicycles.</li> <li>3. Knows how to select suitable play spaces that are free from hazards.</li> <li>4. Knows what constitutes a correct shoe and stocking.</li> <li>5. Knows what constitutes a properly adjusted seat and desk.</li> <li>6. Knows that mistakes in taking medicines may cause serious poisoning.</li> <li>7. Knows that prompt treatment by a doctor in such a case may save a life.</li> <li>8. Knows that tobacco is probably harmful to growing children.</li> <li>9. Knows that drinks containing alcohol are unsuitable for children.</li> <li>10. Knows that a healthy person should not feel the need for artificial stimulants.</li> <li>11. Knows that caffeine or similar stimulants are contained in coffee, tea, chocolate, cocoa, and some soft drinks.</li> <li>12. Knows that hearing may be injured by a very loud noise or a blow on the ear.</li> <li>13. Knows that there is a delicate membrane called the ear drum, stretched across the ear passage, which can be broken by rough treatment.</li> <li>14. Knows the correct reading habits.</li> <li>15. Knows that eyes are rested by looking into distance and by closing them.</li> <li>16. Knows how to recognize and avoid poison ivy and sumach.</li> <li>17. Knows that minor injuries (cuts, blisters, etc.), should be cared for immediately.</li> <li>18. Knows proper procedure of First Aider at scene of accident.</li> <li>19. Knows how to give First Aid care of minor wounds, severe bleeding, fainting, dog and insect bites, and poison ivy.</li> <li>20. Knows that much advertising that appears in print and by radio is misleading.</li> </ol>	<ol style="list-style-type: none"> <li>1. Recognizes careful preparation for a game or outing as a commendable trait.</li> <li>2. Realizes that riding bicycle involves responsibility on his part.</li> <li>3. Is proud of good judgment in preventing accidents.</li> <li>4. Is proud of having abundant natural energy.</li> <li>5. Is eager to avoid all drugs which tend to decrease his natural efficiency.</li> <li>6. Appreciates the help and pleasure which ears and eyes give.</li> <li>7. Feels that prompt care of injuries is commendable.</li> <li>8. Is not readily influenced by advertising in print and by radio.</li> </ol>

SKILLS AND HABITS	A FEW SUGGESTED UNITS	SUGGESTED ACTIVITIES
<ol style="list-style-type: none"> <li>1. See Safety Course of Study, P. E. Course of Study.</li> <li>2. Uses bicycle in accordance with rules of road.</li> <li>3. Uses suitable home, school, and community play spaces for play.</li> <li>4. Takes part in planning for safe adventures on and in the water, in woods, and fields, on the trails.</li> <li>5. Considers hazards in selecting places to play.</li> <li>6. Uses well-fitting footwear suitable for various occasions. (Sneakers for playroom, sensible shoes for every day, heavy socks for hiking, dress shoes for parties, etc.)</li> <li>7. Avoids picking teeth and biting hard substances.</li> <li>8. Keeps feet under desk.</li> <li>9. Assists in adjustment of seat and desk.</li> <li>10. Does not taste or swallow pills, medicines, etc., unless given by a responsible adult.</li> <li>11. Does not smoke.</li> <li>12. Does not strike anyone around the head or shout in anyone's ear.</li> <li>13. Does not attempt to remove wax or any foreign body from ear.</li> <li>14. Tells teacher if eyes hurt or if board is not seen clearly.</li> </ol>	<ol style="list-style-type: none"> <li>8. How Our Eyes and Ears Work.</li> <li>9. Use and Misuse of Drugs.</li> <li>10. What We Should Know About First Aid. General directions for First Aider at scene of accident. Care of minor wounds. Control of Bleeding. Fainting. Dog and insect bites. Poison ivy.</li> <li>11. What Can We Believe? Purposes of advertising. Questionable value of advertising as a guide to healthful living.</li> </ol>	<ol style="list-style-type: none"> <li>1. Charting results of tests of vision and hearing.</li> <li>2. Comparing the eye with a camera by use of models and diagrams.</li> <li>3. Using a light meter (may be borrowed from local electric light company).</li> <li>4. Comparing inner ear to drum by studying simple diagrams.</li> <li>5. Listing ways of protecting eyes and ears.</li> <li>6. Watching film—"The Eye"</li> <li>7. Collecting facts on common drugs (nicotine, caffeine, theobromine, alcohol).</li> <li>8. Demonstrating First Aid techniques recommended for 5th grade.</li> <li>9. Listing sources from which people get health advice. Evaluate these.</li> <li>10. Collecting opinions of authorities to be used in critically evaluating advertising having a bearing on health.</li> <li>11. Presenting and discussing actual examples of misleading advertising.</li> </ol>

**GRADE 5. OVERVIEW CHART. (continued)**

AREAS OF GROWTH	MAJOR FIELDS	KNOWLEDGE AND UNDERSTANDINGS	ATTITUDES AND APPRECIATIONS
ADAPTATION TO PHYSICAL ENVIRONMENT	ADJUSTMENT TO ATMOSPHERIC CONDITIONS	<ol style="list-style-type: none"> <li>1. Knows what kind of clothing to wear in different kinds of weather.</li> <li>2. Knows that it is dangerous to allow skin to get a severe sunburn.</li> <li>3. Knows that severe frostbite should have immediate treatment.</li> <li>4. Knows that chilling of body increases susceptibility.</li> <li>5. Knows best room temperature is 68°.</li> <li>6. Knows how to read thermometer.</li> <li>7. Knows how to help adjust windows.</li> </ol>	<ol style="list-style-type: none"> <li>1. Is willing to wear proper clothing.</li> </ol>
ADAPTATION TO SOCIAL ENVIRONMENT	RELATIONSHIP WITH OTHERS	<ol style="list-style-type: none"> <li>1. Knows that the family is the most important unit in society.</li> <li>2. Understands contributions of mother and father to home.</li> <li>3. Understands how a child can help to make a happy home.</li> <li>4. Knows that he must share privileges of home with brothers, sisters, and parents.</li> <li>5. Knows the manners child of his age should have.</li> <li>6. Is learning some of the skills of homemaking.</li> <li>7. Knows how to care for animals and pets.</li> <li>8. Knows what the services of the community are in relation to community housekeeping and recreation facilities.</li> </ol>	<ol style="list-style-type: none"> <li>1. Enjoys family games, excursions, and outings.</li> <li>2. Is pleased with achievement of other members of family.</li> <li>3. Has co-operative attitude in the home, school, and community.</li> <li>4. Appreciates what parents do for him.</li> <li>5. Has confidence, pride, and trust in family.</li> <li>6. Appreciates services given by school. (teachers, etc.)</li> <li>7. Appreciates services given by the community.</li> </ol>

SKILLS AND HABITS	A FEW SUGGESTED UNITS	SUGGESTED ACTIVITIES
<ol style="list-style-type: none"> <li>1. Chooses suitable clothes.</li> <li>2. Removes outside wraps, sweater, ski pants, overshoes, etc. when indoors.</li> <li>3. Removes wet clothes.</li> <li>4. Selects sunny play spot except during very hot weather.</li> <li>5. Refrains from excessive, vigorous play in hot sun.</li> <li>6. Protects self against rapid chilling after exercise.</li> <li>7. Does not sit on cold or damp ground.</li> </ol>	<ol style="list-style-type: none"> <li>12. Clothing for Every Climate. World variations in climate. Clothing adaptation to different climates. Meeting New England clothing problems wisely. See Units #1, 3, 4.</li> </ol>	<ol style="list-style-type: none"> <li>1. Making comparative lists showing clothing appropriate to different climates.</li> <li>2. Making a mural or a frieze showing clothing of people living in different climates.</li> <li>3. Holding a style show showing suitable clothing for the variations in New England climate.</li> </ol>
<ol style="list-style-type: none"> <li>1. Is helpful in the home in ways suited to his capacity.</li> <li>2. Carries on a good deal of his recreational activity with members of his family.</li> <li>3. Respects rights of others but at same time defends his own.</li> <li>4. Has reasonably good manners at table and elsewhere.</li> <li>5. Does not make excessive demands upon parents.</li> <li>6. Bears pain and disappointment bravely.</li> <li>7. Helps to care for younger brothers and sisters.</li> <li>8. Confides in parents and consults them about problems or questions.</li> <li>9. Is considerate of younger children.</li> <li>10. Takes responsibility for care of pets.</li> <li>11. Is courteous and respectful in his relationships with adults.</li> <li>12. Plays and works pleasantly with others.</li> <li>13. Does not tease or bully.</li> <li>14. Obeys rules of the group and community.</li> <li>15. Shows regard for public and private property.</li> <li>16. Shares in good housekeeping in the schoolroom.</li> <li>17. Exercises proper self-control for a child of his age in relation to strong emotions, desires, and behavior.</li> <li>18. Is realistic in facing unpleasant tasks and situations.</li> <li>19. Helps keep community clean by putting waste in proper places.</li> <li>20. Tries to overcome fears such as fear of hurting oneself, failure.</li> </ol>	<ol style="list-style-type: none"> <li>13. Are You Good Company For yourself? For your family? For your friends?</li> <li>14. My Share in Making The Home. What goes to make up a real home? Co-operative planning to achieve a real home. My part in making the home.</li> <li>15. Keep Your Chin Up. See outline on following pages.</li> <li>16. Bringing Up Pets.</li> </ol>	<ol style="list-style-type: none"> <li>1. Listing and discussing qualities that make for popularity.</li> <li>2. Checking self against this list and making a plan for improvement.</li> <li>3. Demonstrating social techniques with child's range of experience; such as performing introductions, answering telephone, visiting in homes of friends, courtesies toward elders, attending public functions, conduct on street, and in vehicles, etc.</li> <li>4. Reporting on a new home-making skill acquired; such as planting a garden, cooking a new dish, making something with tools, etc.</li> <li>5. Discussing ways of overcoming fears. (See Unit—<b>Keep Your Chin Up.</b>)</li> </ol>

**GRADE 5.****UNIT: PLANNING A PICNIC.**

## GENERAL STATEMENT OF OBJECTIVES.

All children like picnics. The purpose of this unit is to make the children recognize the factors which contribute to a successful picnic.

## POSSIBLE APPROACHES.

Nature hike with possible picnic spot; suggested activity for a special celebration; discussion of previous picnic experiences. (Note: Little approach is necessary.)

## FORMULATION OF PROBLEM. (Planning)

What foods are practical? Hot or cold food? Why wrap sandwiches? Why wash fruit? What shall our program be? What clothes are appropriate? What hazards must be guarded against? What are our responsibilities?

## COLLECTION AND EVALUATION OF DATA. (Research)

Assign committees to work on the following problems: location of picnic ground; transportation if necessary; program; food; clothing; safety measures; assignment of jobs.

Visual report of food included in the lunch for packed lunches or cook-outs.

A diagram of the location chosen for picnic.

A report on a program including activities before and after lunch.

A report concerning the distance to picnic grounds and methods of transportation.

A chart outlining various duties of each child.

A demonstration of proper and improper clothing for a picnic.

A written article on the safety measures necessary.

Short demonstration of care of minor cuts and a nose bleed.

Pictures of poison plants with explanation.

## CULMINATING ACTIVITY.

The Picnic.

## EVALUATION.

Observe the reactions of the children at the picnic as individuals and as a group.

Report by each committee.

**GRADE 5.****UNIT: KEEP YOUR CHIN UP!**

## GENERAL STATEMENT OF OBJECTIVES.

This unit should show child that it is important to think as well as act in a healthy manner. Stress "getting along with others".

## POSSIBLE APPROACHES.

An incident concerning proper pride, fair play, truthfulness, etc.

A severe disappointment coming to the class or to a pupil.

A newspaper or magazine account of someone meeting a difficult situation bravely.



### FORMULATION OF PROBLEMS. (Planning)

Why are some children afraid of the dark? What other things are we afraid of? Is a black cat unlucky? Can poor luck be overcome? Why are we afraid? Do we like to work? Do we like to play? To whom do we go if we are in trouble? Should one ever be afraid? Who is a "good sport"? What can we do to get over fear of anything? What do we do when we are unhappy? What should we do? Can we always have what we want? What are emotions?

### COLLECTION AND EVALUATION OF DATA. (Research)

Health textbooks, articles in magazines and newspapers, biographical books, stories.

Interview with parents and other adults.

Collecting and discussing superstitions.

Listing common emotions.

Collecting slogans, proverbs, and old sayings on this subject.

Write and read a story on "How To Be a Good Sport"; "Keeping Your Chin Up"

Group discussion on "What If We Can't Have What We Want?"

### CULMINATING ACTIVITIES.

Exhibit of posters made by children to illustrate points discussed.

Dramatization of play written by children.

A program of tableaux or skits illustrating slogans listed.

### EVALUATION.

Observation of children's attitudes.

Have any succeeded in overcoming any false fear?

Are they happier? Are they better sports?



**GRADE 6.****ABSTRACT OF CHART.**

SCOPE: Continuation of cycle plan; i.e., concentration of direct teaching in selected fields.  
Incidental teaching in all fields as need arises.

CHIEF MOTIVATION: Health for GROWTH, ATHLETICS, PERSONALITY, and CITIZENSHIP.

GENERAL EMPHASIS: Growing scientific attitudes. Increased feeling of personal responsibility as a member of the group. Simple consumer points of view. Increased emphasis on health as a means to success.

AREAS OF GROWTH	MAJOR FIELDS	CONTENT	SUGGESTED UNITS
ORGANIC FUNCTIONING	EATING	Simple concepts of digestion. Relation of food to successful living. Economics of food purchase. Critical evaluation of advertising.	<ol style="list-style-type: none"> <li>1. Food and Successful Living.</li> <li>2. What Happens to the Food We Eat.</li> <li>3. Biting Facts.</li> <li>4. Getting the Most for Your Money.</li> <li>5. I Know Better Than That!</li> <li>6. Our Health an Asset to Our Nation.</li> </ol>
	ELIMINATION	Importance to health of proper elimination of body wastes. Avenues of elimination.	Taught incidentally and in connection with other units.
ADAPTATION TO PHYSICAL ENVIRONMENT	PROTECTION AGAINST DISEASE	Understanding of the methods of control of communicable diseases. Concept of personal and community responsibility for adequate control.	<ol style="list-style-type: none"> <li>7. Friends or Enemies?</li> <li>8. Fighting Communicable disease.</li> <li>9. My Health Examination.</li> </ol> See also #6 and #12.
	PROTECTION AGAINST INJURY	Continued from Grade V.	10. Use and Misuse of Drugs. (A continuation from Grade V.)
ADAPTATION TO SOCIAL ENVIRONMENT	RELATIONSHIP WITH OTHERS	Continued from Grade V.	<ol style="list-style-type: none"> <li>11. What Am I Worth to My Employer?</li> <li>12. What Makes A Hero? In Athletics? In Science? (Or Health?)</li> <li>13. Our World Needs Good Sports!</li> </ol>
	PERSONAL APPEARANCE AND GROOMING	Concept of good appearance as influenced by good physical health, good mental health, good taste, and reasonable attention to grooming. Value of good appearance for success and popularity.	14. Making the Most of Your Appearance (or What Others See).

For detailed outline, see following pages.

For opportunities for integration, see outlines of other subjects, particularly Science, and Social Studies.

## GRADE 6. OVERVIEW CHART.

AREAS OF GROWTH	MAJOR FIELDS	KNOWLEDGE AND UNDERSTANDINGS	ATTITUDES AND APPRECIATIONS
ORGANIC FUNCTIONING	EATING	<ol style="list-style-type: none"> <li>1. Knows the right eating habits for children of this age. (See list of Habits and Skills).</li> <li>2. Knows simple processes of digestion.</li> <li>3. Knows that good food is important for personal appearance and athletic prowess.</li> <li>4. Knows that good food is necessary to build strong citizens of a strong nation.</li> <li>5. Knows what foods to eat every day and why: a) Foods which give us energy. Some of these are whole-grain bread and cereals. b) Foods to keep us warm. Some of these are butter, bacon, and cream. c) Foods to build and repair body tissues. Some of these are milk, fish, meat, eggs, and cheese. d) Foods that contain vitamins and minerals which help protect against disease and help our bodies work efficiently. Some of these are fresh fruits, vegetables, and milk. e) One raw, one yellow vegetable in addition to potato to be eaten daily. f) Two fruits to be eaten daily. h) Amount of water needed varied according to changes in activity and temperature.</li> <li>6. Knows that the laws covering plain milk do not cover artificially flavored milk.</li> <li>7. Knows the value of evaporated milk.</li> <li>8. Knows that frying is least desirable cooking method.</li> <li>9. Knows that concentrated sweets, pickles, and spices may irritate stomach lining.</li> <li>10. Knows general pattern of 3 regular meals and some adequate menus.</li> <li>11. Knows how to create pleasant surroundings for meal.</li> <li>12. Knows how good teeth aid in digestion.</li> <li>13. Knows that a child of his age usually has all of his permanent teeth except the wisdom teeth.</li> <li>14. Knows the development, structure, and types (technical names) of teeth.</li> <li>15. Knows that the best way to care for the teeth is to eat right foods; visit dentist at least twice a year; and keep teeth clean.</li> <li>16. Has a simple knowledge of pure food laws.</li> <li>17. Knows that much advertising that appears in print and by radio is misleading.</li> </ol>	<ol style="list-style-type: none"> <li>1. Begins to appreciate his responsibility in choice of foods, time of eating, and amount of food eaten.</li> <li>2. Enjoys the foods which help him achieve his desired goals (good appearance, athletic prowess, citizenship).</li> <li>3. Is not fussy or prejudiced about foods.</li> <li>4. Is interested in growth chart.</li> <li>5. Enjoys eating in attractive surroundings.</li> <li>6. Realizes that mealtime should be a pleasant occasion.</li> <li>7. Is proud of having clean, sound teeth.</li> <li>8. Is not readily influenced by advertising in print and by radio.</li> </ol>

SKILLS AND HABITS	A FEW SUGGESTED UNITS	SUGGESTED ACTIVITIES
<ol style="list-style-type: none"> <li>1. Eats adequate amounts of essential foods which are plain milk, dark bread, cereals, vegetables, eggs, fish, meat, and butter.</li> <li>2. Eats sweets only at end of meal.</li> <li>3. Does not indulge in excessive sweets at any time.</li> <li>4. Avoids fried foods as much as possible.</li> <li>5. Drinks water frequently and avoids tea, coffee, soft drinks, and artificially flavored milk.</li> <li>6. Avoids iced drinks when overheated.</li> <li>7. Eats only milk, fruit, and crackers between meals.</li> <li>8. Sits at table and takes adequate time for meals.</li> <li>9. Does not drink while there is food in mouth.</li> <li>10. Drinks slowly.</li> <li>11. Eats only at regular times and eats three times daily.</li> <li>12. Uses care in choosing where he will eat when eating away from home.</li> <li>13. Rests or plays quietly after meals.</li> <li>14. Does his part to make meal enjoyable.</li> <li>15. Chews some food daily which exercises teeth and gums: celery, raw carrot, toast, crusts, etc. (No other means of exercising teeth is necessary.)</li> </ol>	<ol style="list-style-type: none"> <li>1. Foods and Successful Living. See detailed outline on following pages.</li> <li>2. What Happens to the Food We Eat. Digestion. Assimilation. Elimination of waste.</li> <li>3. Biting Facts.</li> <li>4. Getting the Most for Your Money. Best values in food. Best values in clothing. (See Personal Appearance and Grooming.)</li> <li>5. I Know Better Than That! Analysis of superstitions. Study of Pure food laws.</li> <li>6. Our Health an Asset to Our Nation. Discovery and care of defects. Nutrition. Exercise.</li> </ol>	<ol style="list-style-type: none"> <li>1. Making 10 rules for healthful living and collecting pictures to illustrate each rule. Telling how these rules will help to build a healthy family.</li> <li>2. Using books, magazines, newspapers, pamphlets, etc., to study about foods.</li> <li>3. Making simple diagram of digestive tract.</li> <li>4. Writing a composition showing how good food helps to make a good athlete, a good worker, a popular boy or girl.</li> <li>5. Setting a table correctly and making it attractive.</li> <li>6. Studying own teeth in mirror to recognize types and judge appearances.</li> <li>7. Using teeth model. (From State Dept. of Public Health.)</li> <li>8. Collecting information on topic, "White Sugar vs. Natural Sweets".</li> <li>9. Making tooth powder in classroom (recipe from Department of Public Health).</li> <li>10. Watching films on Food and Teeth. Note: See outline of unit "Food and Successful Living" for many other activities.</li> </ol>

**GRADE 6. OVERVIEW CHART. (continued)**

AREAS OF GROWTH	MAJOR FIELDS	KNOWLEDGE AND UNDERSTANDINGS	ATTITUDES AND APPRECIATIONS
ORGANIC FUNCTIONING	ELIMINATION	<ol style="list-style-type: none"> <li>1. Knows that bowels should be emptied daily at regular times.</li> <li>2. Knows that all living things must eliminate waste.</li> <li>3. Knows that the avenues of elimination for the body are bowels, kidneys, lungs, and skin.</li> <li>4. Knows that some food cannot be entirely changed into a form which the body can use.</li> <li>5. Knows that this waste material is stored in the large intestine until it can be eliminated through a bowel movement.</li> <li>6. Knows that a delayed bowel movement is called constipation.</li> <li>7. Knows that habitual constipation should be treated only by a physician.</li> <li>8. Knows that right foods and proper exercise are better than drugs in regulating elimination.</li> <li>9. Knows that habitual use of drugs is harmful.</li> <li>10. Knows what is meant by "roughage", and knows that excessive roughage may be harmful.</li> </ol>	<ol style="list-style-type: none"> <li>1. Assumes personal responsibility for regular habits of elimination.</li> <li>2. Is matter-of-fact about attending to elimination.</li> </ol>
ADAPTATION TO PHYSICAL ENVIRONMENT	PROTECTION AGAINST DISEASE	<ol style="list-style-type: none"> <li>1. Knows right habits for protection against disease. (See Habits and Skills.)</li> <li>2. Knows dangers of improper blowing of nose.</li> <li>3. Knows why hands and objects should be kept away from mouth.</li> <li>4. Knows value of medical, dental, and nursing services, and how he should profit from them.</li> <li>5. Knows how community protects people against infection.</li> <li>6. Knows why spitting on floors and sidewalks may spread disease.</li> <li>7. Knows difference between "clean" and "sterile".</li> <li>8. Knows that there are both helpful and harmful bacteria.</li> <li>9. Knows meaning of "immunity".</li> <li>10. Knows how to sterilize.</li> </ol>	<ol style="list-style-type: none"> <li>1. Enjoys cleanliness in regard to person, food, equipment, as listed under Habits and Skills.</li> <li>2. Co-operates with those caring for sickness.</li> <li>3. Observes quarantine willingly.</li> <li>4. Is willing to stay home when not feeling well.</li> <li>5. Dislikes having flies around.</li> <li>6. Co-operates when having medical or dental care.</li> <li>7. Is able to preserve precautions without feeling fear.</li> <li>8. Wants to have clean, sound teeth.</li> <li>9. Is willing to assume some responsibility for protection against disease.</li> <li>10. Likes feeling of cool splash.</li> </ol>

SKILLS AND HABITS	A FEW SUGGESTED UNITS	SUGGESTED ACTIVITIES
<ol style="list-style-type: none"> <li>1. Goes to toilet at a regular time each day for a bowel movement.</li> <li>2. Reports to Mother if bowels do not move daily.</li> </ol>	<p>See Unit # 2</p>	
<ol style="list-style-type: none"> <li>1. Does not taste or takes bites of other people's food.</li> <li>2. Washes hands before eating and after toilet.</li> <li>3. Does not eat food that has dropped on the floor.</li> <li>4. Uses bubbler correctly.</li> <li>5. Does not eat unknown berries and leaves.</li> <li>5. Uses own glass, cup, etc.</li> <li>7. Keep hands away from eyes, nose, mouth, and ears.</li> <li>8. Uses own clean face cloth, towel, and soap.</li> <li>9. Never touches eyes except with clean cloth.</li> <li>10. Uses clean handkerchief or tissue to keep nose clean.</li> <li>11. Covers nose and mouth when coughing or sneezing.</li> <li>12. When sick, keeps away from playmates.</li> <li>13. Keeps away from those who are sick.</li> <li>14. Reports to an older person when not feeling well.</li> <li>15. Avoids rubbing eyes.</li> </ol>	<ol style="list-style-type: none"> <li>7. Friends or Enemies? See record of developed Unit in Introduction to Chapter.</li> <li>8. Fighting Communicable Disease. What is a communicable disease? How is it spread? Prevention (immunity, quarantine, cleanliness, etc.) See Unit # 6.</li> <li>9. My Health Examination. See outline on following pages.</li> </ol>	<ol style="list-style-type: none"> <li>1. Studying slides of bacteria through microscope.</li> <li>2. Using agar plates to grow bacteria from hands.</li> <li>3. Reading stories of conquest of malaria and yellow fever.</li> <li>4. Growing mold on bread in dark, damp place, and sunny, dry place.</li> <li>5. Making and studying a list of things that can be done in school to prevent spread of infection.</li> <li>6. Writing and presenting a play about Edward Jenner and vaccination.</li> <li>7. Sending a committee to Board of Health to find out what it does to prevent spread of communicable disease, and the cost per person to the community.</li> </ol>

**GRADE 6. OVERVIEW CHART. (continued)**

AREAS OF GROWTH	MAJOR FIELDS	KNOWLEDGE AND UNDERSTANDINGS	ATTITUDES AND APPRECIATIONS
ADAPTATION TO PHYSICAL ENVIRONMENT	PROTECTION AGAINST DISEASE	<p>11. Knows that vaccination gives immunity to smallpox; and that diphtheria may be prevented by use of toxoid.</p> <p>12. Knows the use of a microscope.</p> <p>13. Knows that sunlight helps to kill bacteria.</p> <p>14. Knows type of environment which bacteria like.</p> <p>15. Knows that each disease has its specific germ or virus.</p> <p>16. Knows modes of entrance of bacteria into body.</p> <p>17. Knows signs of inflammation.</p> <p>18. Knows that infection in tonsils may cause disease in other parts of body.</p> <p>19. Knows that tuberculosis is a communicable disease, how it is spread, and method of prevention.</p> <p>20. Knows the different types of bubbler-fountains, and why the vertical type is least safe.</p> <p>21. Knows structure and development of teeth.</p> <p>22. Knows how caries spread.</p> <p>23. Knows why dentists fill some teeth and pull others.</p> <p>24. Does not dive while swimming if there is any middle ear infection.</p> <p>25. Knows how foods are protected against contamination at home and in store.</p> <p>26. Knows that a yearly health examination is yard-stick for measuring condition and a means of preventing future problems.</p>	<p>11. Feels confidence in his doctor as one who is trying to help him.</p> <p>12. Is willing to talk freely to his doctor about any health problems instead of keeping a worry to himself.</p> <p>13. Wants to understand the process of the examination, the results, and recommendations.</p> <p>14. Is willing to follow medical advice given.</p>



SKILLS AND HABITS	A FEW SUGGESTED UNITS	SUGGESTED ACTIVITIES
<p>16. Goes to older person if something gets into eye.</p> <p>17. Does not touch strange animals.</p> <p>18. Aids in eliminating breeding place of flies.</p> <p>19. Helps keep flies out of buildings by closing screen doors.</p> <p>20. Helps protect food from flies.</p> <p>21. Keeps toilet covers closed (outdoor toilets).</p> <p>22. Uses toilet correctly and flushes toilet after use.</p> <p>23. Does not drink water from unknown sources.</p> <p>24. Washes raw fruit before eating.</p> <p>25. Visits dentist at least once a year.</p> <p>26. Visits doctor at least once a year.</p> <p>27. Does not wet fingers in mouth to turn pages.</p> <p>28. During a cold, uses clean cloths or tissues which can be burned after use.</p> <p>29. Stays away from movies and other crowded places during an epidemic.</p> <p>30. Blows nose properly.</p>		<p>8. Studying the life cycle of the fly and mosquito, and method of extermination.</p> <p>9. Keeping graph of absences because of colds.</p>

ADAPTATION TO SOCIAL ENVIRONMENT	PROTECTION AGAINST INJURY	CONTINUED FROM GRADE V	
	RELATIONSHIP WITH OTHERS	(Continued from Grade V. The units suggested on the opposite page may be worked out to advantage in this grade if there seems to be a need to carry the emotional and social development of the pupils a little beyond what was accomplished in the fifth grade.)	
	PERSONAL APPEARANCE AND GROOMING	<ol style="list-style-type: none"> <li>1. Knows the essentials of good grooming. (See list of Habits and Skills.)</li> <li>2. Knows that good grooming is an important factor in success.</li> <li>3. Knows that good health aids personal appearance.</li> <li>4. Knows that good posture often reflects mental attitude.</li> <li>5. Knows what good posture is. (See P. E. outline.)</li> <li>6. Knows how to care for hair and nails.</li> <li>7. Knows how to care for tooth brush.</li> <li>8. Knows how to select proper type of tooth brush.</li> </ol>	<ol style="list-style-type: none"> <li>1. Takes responsibility for cleanliness and personal appearance.</li> <li>2. Likes to take a bath.</li> <li>3. Is willing to make himself clean and attractive at suitable times.</li> <li>4. Likes feeling and appearance of clean teeth.</li> </ol>

	<p>10. Use and Misuse of Drugs. (A continuation from Grade 5.)</p>	
	<p>11. What am I worth when I work for money? doing my best; being on time; being loyal to my employer.</p> <p>12. What makes a hero? in athletics; in science; (Health) biographies of great leaders.</p> <p>13. Our World Needs Good Sports: in homes; in schools; in town, state and country.</p>	
<p>1. Keeps belongings tidy.</p> <p>2. Arranges clothes neatly when he goes to bed.</p> <p>3. Hangs up outside wraps.</p> <p>4. Takes a bath at least twice a week when possible.</p> <p>5. Brushes teeth at least twice a day.</p> <p>6. Keeps nails clean.</p> <p>7. Washes hair regularly at frequent intervals.</p> <p>8. Wears clean underclothes.</p> <p>9. Comes to school neat and clean.</p>	<p>14. Making the Most of Your Appearance (or What Others See). Facial expression. Cleanliness. Posture. Clothing.</p>	<p>1. Making a list of all the characteristics which go to make up a pleasing appearance; c l a s s i f y these and use.</p> <p>2. Listing and discussing techniques for good grooming and care of clothing.</p> <p>3. Discussion on sub- ject "Good Grooming Is More Important in Good Appearance than Good Features."</p> <p>4. Making and watch- ing a posture test.</p> <p>5. Finding examples in painting and sculpture that show that artists be- lieve good posture is an aid to beauty.</p> <p>6. Collecting pictures of appropriate clothing for boys and girls.</p>

**GRADE 6:****UNIT: FOOD AND SUCCESSFUL LIVING.**

## GENERAL STATEMENT OF OBJECTIVES.

This unit will be of greatest value only when based on the children's own experiences and individual interests in foods and eating. Such questions as the number of pupils in top-notch health (as judged by the doctor's examination), the usual foods and pattern of meals eaten, the amount of coffee or tea, the number of "cokes" between or at meals, should be brought down to the classroom level by research activities of the children themselves. Teachers should select only the activities most pertinent to their own classes and not include all suggested here.

## OBJECTIVES.

To know what groups of foods are important in building the strength, vigor, good looks and happy disposition necessary for successful living.

To find out why certain foods are more valuable than others for 6th graders.

To learn how to include all these foods, and to practice choosing meals rich in them, whether eating at home, at school, or away.

To strengthen good eating habits, and prevent or improve poor ones.

To learn to like new foods and those prepared in unfamiliar ways.

To discover why people eat what they do and how new eating habits are built.

To learn to get one's money's worth in foods at the school-lunch, the market, and the drugstore.

## POSSIBLE APPROACHES

1. If unit is started in the fall or after a vacation, discussion of experiences in eating away from home or under interesting circumstances.
2. A food-habits survey of the meals commonly eaten by the children.
3. Establishment of a new lunchroom, or a special project in the regular lunchroom.
4. An important athletic event with its training rules.
5. A film such as "The School that Learned to Eat."

## FORMULATION OF PROBLEMS. (Planning.)

How do foods help toward successful living?

Which foods are most important to us and why?

Which common foods do least for us?

How do eating habits affect success in school and with friends?

How much food does it take to feed a 6th grade pupil for one week? How much does it cost?

Is it hard to learn to like new foods? How can it be done? When is it easiest, at home, at school, at camp?

Do the flavors, textures, appearance, and smell of foods make any difference at meal-time?

How can we make mealtime fun for others?

What do labels tell us about foods?

## COLLECTION AND EVALUATION OF DATA. (Research.)

Invite the school nurse to report on the school doctor's physical examinations telling how he judges health and nutrition. How many are well-nourished, over-weight, under-weight,

or needing defects corrected? Make a class chart to record growth and improvement during the year.

Make a food-habit survey to find out how many eat each of the Basic 7 Foods every day. This may be a short or long-time activity. It has planning, research, culminating activities.

Advanced classes may construct a large chart or series of exhibits showing the most important nutrients and which foods supply each of them. (See pages 16-17 "Nutrition Handbook for Teachers".)

Using the large food chart, make lists of substitutes for beef, or bottled milk, or oranges, etc.

Find out how many A lunches are eaten every day.

Experiment with learning to like new foods, or favorite foods prepared in new ways.

Work with parents and lunch manager in this.

Encourage children to make their own lists of "Foods I Like", "Foods I Do not Like", "Foods I am Learning to Like"; ask them to write up their experiences in trying new foods.

Run animal feeding experiments to show the differences in food values or use the film to show this.

Find reports of food experiments; and ways in which better food improves children's health.

Using U. S. Department of Agriculture food lists from a nutritionist or home economics teacher, let pupils find the amounts of each food for children of their age, for families like theirs, or for groups chosen by the class. Have committee find the cost of food for 10-12-year-old child, or a family group, in different stores such as a small neighborhood store, and a big supermarket. This may be worked in with arithmetic classes.

Have the class compile a collection of labels from different types of foods. Study statements; make reports such as "What we found on cereal labels," etc., "How this helps us choose food".

## CULMINATING ACTIVITIES.

Make final charts or notebook showing improvement between two food habit surveys, growth in height and weight, or accomplishments in learning to like new foods.

Using play money, food models and empty boxes, make an exhibit or a mural of meals for a family, food from farm to table, a market order and the cost, or an idea chosen by the children.

Have a tasting party. Invite another grade, or certain groups for children, or parents. Choose new foods or those commonly disliked now prepared in new and better ways. A recipe or menu book may be made to take home. This activity may be tied in with social science units on foods in other countries or with United Nations projects, etc.

Plan well-balanced menus for the lunchroom with the co-operation of the manager. Help in "selling" these to the rest of the school by means of publicity, exhibits.

Present a program and exhibit on "Getting Our Money's Worth in Foods". This may be based on lunches, labels, meal planning, or food buying.

Write letters to a school in a distant part of America, or in another country, asking for information on eating habits, school lunches, favorite foods.

Show a nutrition film to another class after having pre-viewed it and worked out an introduction. Or plan and show a homemade movie or strip-film.

Exhibit animals to other classes telling the story behind their size, looks and growth records.

## SUGGESTIONS FOR EVALUATION.

- What improvements does the final food-habit survey show?
- Did the "learning to like" record show some achievement for each child?
- How much have eating habits improved at the lunchroom? At home?
- Have parents reported better eating habits, such as more interest in eating breakfast, fewer rich sweets between meals, or other improvements?
- Have parents, children, teachers, and lunchroom workers all participated in some ways?
- Do the school nurse and physician see any improvements in nutrition?
- Have other classes benefited by projects carried on or by materials produced in the 6th grade?
- Have the interests and resources of other teachers been utilized as effectively as possible?
- Was the work as closely integrated in classroom and other activities as possible, and duplication avoided?

## REFERENCES FOR TEACHERS.

**A. Books.**

Schneider, Herman and Nina. HOW YOUR BODY WORKS. New York: William R. Scott, 1949.

**B. Pamphlet.**

GROWING THROUGH SCHOOL LUNCH EXPERIENCES. Bulletin 33A. Florida State Department of Education, Tallahassee. (177 pages) 85c.

APPRAISING FOOD HABITS; AN EVALUATION DEVICE WITH SUGGESTED PROCEDURES FOR CLASSROOM TEACHERS. (F. E. Whitehead, author) Bureau of Educational Materials, State University, Baton Rouge, Louisiana.

NUTRITION HANDBOOK FOR TEACHERS. Nutrition Staff, Massachusetts Department of Health. Massachusetts Department of Education, 200 Newbury Street, Boston 16, Massachusetts.

SCHOOL LUNCH CONSULTATION. Massachusetts Department of Education, or Community School Lunch Office, 600 Washington Street, Boston; and Nutritionists of the Massachusetts Department of Public Health.

HEALTH IN SCHOOLS. Massachusetts Department of Education. (See the school superintendent.)

GROUP FOOD HABIT SURVEY FORMS. District Nutritionists, Massachusetts Department of Public Health.

THE CHILD FROM SIX TO TWELVE and THE ROAD TO GOOD NUTRITION. United States Children's Bureau. Order from the Massachusetts Department of Public Health.

DICK'S PLAN. Other Nutrition Education Materials. Millers National Federation, Chicago 6, Illinois.

WATCH THEM GROW. New England Dairy and Food Council, 729 Boylston Street, Boston, Massachusetts. Directions for animal feeding experiments. A film is also available.

GOALS IN NUTRITION EDUCATION IN THE SCHOOLS. SUGGESTED ACTIVITIES IN NUTRITION—KINDERGARTEN THROUGH SIXTH GRADE. Harvard School of Public Health. Order from Nutrition Foundation, Chrysler Building, New York, N. Y.

For more references and resources see any home economics teacher or nutritionist.

**GRADE 6.****UNIT: MY HEALTH EXAMINATION.**

## GENERAL STATEMENT OF OBJECTIVES.

At this age a foundation may be laid for an understanding of the value and importance of a periodic medical examination, a feeling of personal responsibility for securing such an examination, and a knowledge of the techniques for obtaining the greatest good from any such medical service.

## OBJECTIVES.

Get the greatest value from the school medical services and from the family doctor or dentist.

Develop an intelligent appreciation of medical services and a confidence in doctors, dentists, and nurses.

Learn how to arrange for an examination.

Learn how to conduct themselves at such examination, and how to make use of advice given.

Have no unreasonable fear of any medical examination or service.

## POSSIBLE APPROACHES.

A forthcoming appointment for school examinations.

The approaching visit of an X-Ray unit.

A campaign to complete dental, vision, and medical examinations.

The return to school of a pupil having had an illness, or accident necessitating thorough medical service.

A survey of the results found by some school service; such as number of various defects found, or number of pupils in excellent condition.

Newspaper, magazine, or radio account of some new service or program, or some interesting cure through medical science.

A discussion of advertisements of "wonder drugs".

Reading in stories, biographies, or health books about medical services at home and in other countries (medical missionaries, heroes of science).

## FORMULATION OF PROBLEMS. (Planning)

Why does the school doctor come to visit us? the dentist? the nurse?

Why do most people also have a family doctor and dentist?

What is the difference between them?

What are the usual things a doctor does when we go to him for an examination when we are well? when we are sick?

Do we have to have medicine in order to get our money's worth from a doctor's visit? Is good advice from a doctor worth money? Is it worth money to know that we are well and strong? Can we know this for sure without a medical examination? Is there anything to fear about going to a doctor?

If we are worried about something, why is it good to tell it to parents or a doctor or nurse instead of keeping it to ourselves?

Why do some people go to a drug-store instead of a doctor when they are sick? Is this a good thing to do?

How can we co-operate with the doctor or dentist when we have an examination?

Are we old enough to understand some of the tests and examinations given to us?

Is it all right to ask the doctor questions about it?

If a doctor gives us medicine to take, and it doesn't do any good, should we tell him about it?

Is it best to choose one doctor and go to him regularly, or to keep changing doctors? Why?

#### COLLECTION AND EVALUATION OF DATA. (Research)

Read in health books, magazines, and biographies.

Have an interview with a doctor, dentist, nurse, teacher, or parent, and report to class.

Have a panel discussion on such topics as

“When You are Sick, Go To A Doctor Instead of a Drug-Store.”

“Give Your Doctor a Fair Chance—A Baseball Player Gets Three Strikes Before He Is Out.”

“I Learned a Lot From My Complete Health Examination.”

“An Ounce of Prevention Is Worth A Pound Of Cure.”

“What Makes A Good Doctor?”

“What We Owe to the Medical Profession.”

#### CULMINATING ACTIVITIES.

Make a poster exhibit or a mural illustrating various health services.

Write and present a play, a program, or a broadcast, presenting what you have learned.

Invite the doctor, nurse, dentist, other classes, or parents.

Write articles for the school paper urging participation in health services.

Write a biography of some doctor, medical missionary, or scientist—preferably one whom you know.

Make a display of graphs or diagrams showing the results of school health services and correction of defects.

#### SUGGESTIONS FOR EVALUATION.

Has interest been keen in finding facts on the subject?

Has enthusiasm for and participation in health service programs increased?

Have children's reactions to the idea of health examinations become a little more mature? Is there less fear or indifference?

Have there been any favorable reactions from parents? from school medical staff? from family physicians?

#### GENERAL BIBLIOGRAPHY.

##### Teacher.

American Association of School Administrators, HEALTH IN SCHOOLS. Washington, D. C.: Twentieth Yearbook, 1942.

Boldaun, C. P. and Boldau, N. W., PUBLIC HEALTH AND HYGIENE. Philadelphia: W. B. Saunders Co., 1949.

Brownell, Clifford L. PRINCIPLES OF HEALTH EDUCATION APPLIED. New York: McGraw-Hill Book Co., 1941.

Fields and Edgerton, TEACHERS GUIDE FOR HEALTH EDUCATION. Brooklyn: Remsen Press, 1949.



Grout, Ruth, HEALTH TEACHING IN SCHOOLS. Philadelphia: W. B. Saunders Co., 1948.

Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, HEALTH EDUCATION: C. W. Wilson, editor: revised edition. Washington, D. C.: National Education Association, 1949.

Massachusetts Department of Public Health, GUIDE TO THE SCHOOL HEALTH PROGRAM. Boston: State House, 1940.

Meredith, Florence, HYGIENE. Philadelphia: The Blakiston Co., 1941.

Oberteuffer, Delbert, SCHOOL HEALTH EDUCATION. New York: Harper Brothers, 1949.

Patty, Willard W., TEACHING HEALTH AND SAFETY IN ELEMENTARY GRADES. New York: Prentice-Hall, 1940.

Strang, Ruth M. and Smiley, D. F., ROLE OF THE TEACHER IN HEALTH EDUCATION. Boston: The Macmillan Company, 1941.

Turner, C. E., SCHOOL HEALTH AND HEALTH EDUCATION. St. Louis: Mosby, 1941.

Dole, Edgar et al. American Council on Education, COMMITTEE REPORT ON MOTION PICTURES IN EDUCATION. N. Y.; H. W. Wilson Co., 1937.

Haas, Kenneth B., and Parker, Harry, PREPARATION AND USE OF VISUAL AIDS. New York: Prentice-Hall, 1946.

For more complete bibliographies on various aspects of health education, write to Massachusetts Division of Child Hygiene, Department of Public Health, 73 Tremont Street, Boston, Massachusetts; and to Massachusetts Department of Education, Supervisor of Elementary Education, Supervisor of Safety Education, 200 Newbury Street, Boston, Massachusetts.

### Children.

Andress and others, SAFE AND HEALTHY LIVING SERIES, Grades I-VI. Boston: Ginn and Company, 1939.

Book 3—GROWING BIG AND STRONG.

Book 4—SAFETY EVERY DAY.

Book 5—DOING YOUR BEST FOR HEALTH.

Book 6—BUILDING GOOD HEALTH.

Baruch, Bauer, Montgomery, Gray, CURRICULUM FOUNDATION SERIES. New York: Scott, Foresman and Co., 1949.

Health and Development Programs—Grades I to VI.

Grade III—FIVE IN THE FAMILY. Grade V—YOU.

Grade IV—THE GIRL NEXT DOOR. Grade VI—YOU AND OTHERS.

Brownell and others, HEALTH AND SAFETY SERIES.

New York: Rand McNally, 1936—Grades I to VI.

Book 3—FRIENDLY LIVING. Book 5—EVERYDAY LIVING.

Book 4—HAPPY LIVING. Book 6—HELPFUL LIVING.

Brownell and Williams, HEALTH OF OUR NATION. New York: American Book Co., 1941-43, Grades I to VI.

Book 3—FIT AND READY. Book 5—HALE AND HEARTY.

Book 4—SAFE AND SOUND. Book 6.—ACTIVE AND ALERT.

Charters, Smiley, Strang—NEW HEALTH AND GROWTH SERIES. New York: Macmillan Co., 1941—Grades I to IX.

Book 3—HEALTH SECRETS.

Book 5—LET'S BE READY.

Book 4—HEALTHFUL WAYS.

Book 6—HABITS, HEALTHFUL AND SAFE.

Hahn and Winslow, LET'S STAY WELL. New York: Charles E. Merrill and Co., 1938. Grades III and IV.

Jones, Maloney, Morgan, Landis, THE ROAD TO HEALTH. New York: Laidlaw Brothers, 1949, Grades III to VI.

Grade III—EASY STEPS TO HEALTH.

Grade IV—HEALTH TRAILS.

Grade V—YOUR HEALTH AND YOU.

Grade VI—KEEPING HEALTHY.

Turner, Melchior, Curl, HEALTH, SAFETY, and GROWTH SERIES. Boston: D. C. Heath, 1941.

Book 3—GROWING UP.

Book 5—GAINING HEALTH.

Book 4—KEEPING SAFE AND WELL.

Book 6—CLEANLINESS AND HEALTH PROTECTION.

Wilson and others, AMERICAN HEALTH SERIES. New York: Bobbs-Merrill Co., 1942-1948, Grades I to XII.

Grade III—EVERYDAY HEALTH.

Grade IV—HEALTH AT HOME AND SCHOOL.

Grade V—HEALTH AT WORK AND PLAY.

Grade VI—GROWING HEALTHFULLY.

Wood, Whelan, Derrigo, ADVENTURES IN LIVING. New York: Thomas Nelson and Sons, 1936-1938, Grades III to VIII.

Grade V—KEEPING FIT.

Grade III—HOW WE ARE GROWING.

Grade VI—BLAZING THE TRAIL.

Grade IV—MANY WAYS OF LIVING.

(Teacher's Manual)

(Teacher's Manual)

## SUGGESTED FILMS—CLASSIFIED ACCORDING TO AREAS OF GROWTH AND MAJOR FIELDS.

### ORGANIC FUNCTIONING.

#### MAJOR FIELDS.

##### Eating.

WHENEVER YOU EAT. (National Dairy Council) 12 min. sound, color. Deals with the relationships between selection and consumption of foods and physical well-being.

STANLEY TAKES A TRIP. (Gen. N.F.B.) 19 min. sound, color. The story of a balanced diet told in cartoon story form for children.

SOMETHING YOU DIDN'T EAT. (U.S.D.A.) 9 min. sound, produced by Walt Disney. Combines entertainment with instruction about the seven food groups vital to health.

FOR HEALTH AND HAPPINESS. (U.S.D.A.) 11 min. sound, color. Shows the foods making up the diets of healthy, happy children.

STORY OF MILK. (Bray) 30 min. silent. (3 reels)

Reel #1. Production of Milk—covers the modern methods employed in producing and handling milk, from cow to distribution plant.

Reel #2. Distribution of Milk—deals with the distribution of milk, its arrival and handling at the distributing plant, pasteurization, sterilization of equipment, and delivery to consumer.

Reel #3. Making of Cheese—we see how it was made by the pioneers a century ago, and, in comparison, all phases of production in the modern way.

KIDS MUST EAT. (Castle—U.S.A.) 15 min. sound. Features the Quiz Kids. Their performance is worked into a film telling the story of the community school lunch program.

GOOD FOODS: BREAD AND CEREALS. (ERF) 8 min. silent. Feeding chickens bread and milk; feeding chickens grain; feeding horses and cows grain; making oatmeal; bread and cereal for breakfast; cereal and fruit for supper; instruction in mastication and table manners.

### **Elimination.**

DIGESTION. (ERF) 15 min. silent. Covers the complete digestive tract, action of saliva upon food, swallowing, stomach structure, digestion of food, structure and action of both intestines.

### **Physical Activities.**

MUSCLES. (ERF) 15 min. silent. The structure and the use of muscles are strikingly presented by means of actual photography and animation.

HOW WE BREATHE. (Bray) 10 min. silent. The formation of human lungs, and how they function in purifying the blood is shown by animated drawings.

ALL-AMERICAN WAY. (Chicago Tribune) 30 min. sound. An excellent sports picture for any group. Brings out the importance of sports, such as baseball, golf, yacht racing, basketball, boxing, etc., in developing the American boys and girls of today. Shows clean sportsmanship and the best of recreation.

## ADAPTATION TO PHYSICAL ENVIRONMENT.

### MAJOR FIELDS.

#### **Protection Against Disease and Deterrents to Growth.**

I NEVER CATCH A COLD. (Coronet) 1 reel, sound. (Also comes in color.) A young boy disregards the advice of his mother and teachers and catches cold. The proper methods to take in avoiding the common cold are brought out.

THIS IS T.B. (Nat. TB) 10 min. sound. Outlines the cause, the spread, the cure, and the prevention of TB. A forthright presentation of the problem and what remains to be done about it.

DANGER LINE. (Ganz) 18 min. sound. Incentive film to encourage correct walking and posture. Presents an important health problem of growing children: the need for wearing properly fitting shoes with enough "grow room".

HOW DISEASE IS SPREAD. (Bray) 16 min. silent. A series of dramatic episodes showing how bacterial infection is transmitted through carelessness in the ordinary contacts of life; spread of infections; necessity of careful habits; and the proper cleaning of food materials.

THE DOCTOR. (EBF) 10 min. sound. A full day in the life of a hospital specialist is shown, presenting valuable sidelights on hospital, office, and the care and prevention of sickness.

### **Protection Against Injury.**

LET'S PLAY SAFE. (Portafilm) 10 min. sound, color. Combining live photography and animation, this film shows school children on the playground.

FIRST AID—CARE OF MINOR WOUNDS. (EBF) 16 min. silent. Emphasizes the importance of immediate care for even the slightest wound. Demonstrates in detail the proper method of applying sterile dressings.

SAFETY AT PLAY. (EBF) 16 min. silent. A safety film for children. Contrasts safe and unsafe places to play; safety in the use of play equipment; good habits in play; proper care of the playground; and first aid for minor injuries.

EYES—ELEMENTARY. (EBF) 15 min. silent. Photography and diagrams point out similarities of the eye and camera.

HOW WE HEAR. (Bray) 6 min. silent. A study of the structure and functions of the human ear, shown by animated diagrams and photography.

### **Adaptation to Atmospheric Conditions.**

PLAY IN THE SNOW. (EBF) 11 min. sound. Activities of three children and their friends in building a snow man, playing fox and geese, coasting, and skiing. Appropriate clothing, health habits, and safety during play are depicted.

## ADAPTATION TO SOCIAL ENVIRONMENT.

### MAJOR FIELDS.

#### **Relationships to Others.**

FAMILY TEAMWORK. (Frith) 18 min. sound, color. This story of a real American family gives an understanding of how children and parents help each other, how they pull together in the home and in their outside activities.

BILL GARMAN, 12 YEAR OLD BUSINESSMAN. (Frith) 1 reel, sound, color. Bill is a typical American boy who likes to be independent and earn his own money.

#### **Personal Appearance and Grooming.**

CHARM AND PERSONALITY PLUS CHARACTER. (Warren) 37 min. sound, color. Shows how, and arouses determination to be nice to look at, pleasant to talk to, have good manners, build good character, by clean living, clean thinking, clean speech, and clean sportsmanship.

SCRUB GAME. (Mod.) 30 min. sound. Primarily a biological, health and hygiene picture dealing with the skin. The skin is portrayed as the "first line of defense".

POSTURE. (EBF) 15 min. silent. Prepared in co-operation with the American Posture League.

CARE OF THE TEETH. (EBF) 15 min. silent. Made with the co-operation of the American Dental Association.

THE TEETH. (EBF) 11 min. Explains the development and structure of teeth and importance of proper care.

SMILES HAVE IT. (BFS) 10 min. sound. Mary and Tommy respond to an invitation to their quarterly dental check-up.

CLEANLINESS—CLEAN CLOTHES. (EBF) 8 min. silent. Swans preen their feathers. A horse is groomed. A boy polishes his shoes, brushes his coat, takes a clean handkerchief, demonstrates proper use of a napkin. Girls are shown wearing aprons as they help in the home. Proper care of clothing when not in use is demonstrated.

## ADDRESSES FOR RENTALS.

BFS—Baily Film Service, 2044 No. Berendo St., Hollywood 27, Cal., or 404 No. Goodwin St., Urbana, Ill.

BRAY—Bray Studios, Inc., 729 Seventh Ave., New York 19, N. Y.

CAN. N.F.B.—National Film Board of Canada, 620 Fifth Ave., New York 20, N. Y.

CHICAGO TRIBUNE—Public Service Bureau, 1 So. Dearborn St., Chicago 1, Ill.

CORONET—Coronet Instructional Films, 65 E. South Water St., Chicago 1, Ill.

E.B.F.—Encyclopedia Britannica Films, Inc., 20 No. Wacker Drive, Chicago 6, Ill.  
Preview libraries in Boston.

FRITH—Frith Films, P.O. Box 565, Hollywood 28, Cal.

GANZ—William J. Ganz, Institute of Visual Training, 40 E. 46th St., New York 17, N. Y.

KNOWLEDGE BUILDERS.—625 Madison Ave., New York 22, N. Y.

MOD.—Modern Talking Picture Service, Inc., 9 Rockefeller Plaza, New York 20, N. Y. (Library in Belmont, Mass.)

NAT. DAIRY COUNCIL—National Dairy Council, 111 No. Canal St., Chicago 6, Ill.

NAT. TB—National Tuberculosis Association, 1790 Broadway, New York 19, N. Y.

Office of Radio-Audio-Visual Aids, Division of University Extension, Department of Education, 200 Newbury St., Boston 16, Mass.

PORTAFILMS—Portafilms, P.O. Box 752, Glendale, Cal.

U.S.D.A.—United States Department of Agriculture, Office of Motion Pictures, Washington 25, D. C.

WARREN—Warren's Motion Pictures, Box 107, Dayton 1, Ohio.

**CHAPTER XII.****SECTION I: LANGUAGE ARTS.**

	<b>Page</b>
<b>Introduction</b> . . . . .	202
The Total Program	
<b>Overview</b> . . . . .	203
General Overview Chart	
Speech	
Listening	
Integration	
Creative Ability	
Uses of Language in the Day of a Fifth Grade Child	
The Place of Language in Unitary Teaching	
Overview Skills Chart in Language Arts	
Evaluation	
Group Work After Inventory	
<b>Spelling</b> . . . . .	219
<b>Handwriting</b> . . . . .	220
<b>Instructional Aids</b> . . . . .	220
<b>Bibliography</b> . . . . .	221

**INTRODUCTION.****THE TOTAL PROGRAM.**

The Language Arts function in all areas of living and learning in society and permeate all the experience of the child. They are part of the warp and woof of the school curriculum. Whenever and wherever the child listens, talks, reads, and writes he is using language for effective communication. The skill with which he can use the language arts contributes much to his security, success, and happiness.

Language is an integral part of every classroom experience. It is involved in arithmetic, science, reading, social studies, literature, health, safety, music, as well as fine and practical arts. The teacher should be conscious of language development in every situation.

The fundamental function of the total program is to help the child develop through the creative use of ideas and the refinement of skill.

Language is the first avenue open to the child to make himself understood, and in turn, to understand. In order to have a reason for communicating, the child must first have an experience. From the experience grows the need to talk about it. This talking involves the knowledge of skills of correct usage. It also includes the factors of speech work for accuracy in enunciation, pronunciation, articulation, tonal qualities which make listening pleasant, and an organization of the material in a logical sequence. The child is frequently on the listening end of communicative arts — in discussions, on panels, and in presentations. No listening exercise is likely to result in any appreciable amount of learning unless the listener has a conceptual basis for understanding it. When sufficient background has been built up, the child is ready for the reading experience. From experiences grows the need for thinking in terms of fusing all the experiences into creative expression based upon grammar, spelling, composition, and handwriting.

Thinking permeates the entire education program. It is the starting point, the medial pivot, and the final result.

## GENERAL OVERVIEW CHART.

Note: The ability to think with clarity, sequence, and vividness is basic to all success in the language arts. While this ability is, to some extent, inborn, it can be trained and developed under good guidance. The mind must be able to receive, understand, and respond to the thoughts of others as met in reading and listening situations. It must also be able to organize its own thought for expression through speaking, reading aloud, and writing. These areas of understanding and expression are inseparable.

For SKILLS, see a later chart.

### MAJOR FIELDS

#### ORAL EXPRESSION

**Speaking**  
**Reading Aloud**  
**Listening**

#### SAMPLE EXPERIENCES

Announcing, Conversing, Creating, Directing, Discussing, Dramatizing, Entertaining, Evaluating, Explaining, Interviewing, Introducing, Reporting, Story telling, Telephoning.

#### WRITTEN EXPRESSION

**Writing**  
Composition  
Spelling  
Handwriting

Creating, Describing, Evaluating, Explaining, Filling out forms, Letter Writing, Recording data, Reporting, Story writing.

**Reading**

Discussed in Part II of this chapter.

#### SPEECH.

Although many of the speech disorders are diagnosed and corrected in the primary grades, there is a definite need for speech correction at the intermediate grade level. Correction of speech techniques is a necessity in the ultimate development of each pupil's personality. The emphasis in the speech work of grades 4, 5, and 6 should be on the corrective aspect rather than on the oratorical, dramatic approach to speech.

Speech may be considered defective when it is not easily audible and intelligible to the listener. Speech is defective if it is vocally or visibly unpleasant or labored in production. Finally, speech is defective if it is not appropriate to the individual as to his mental and chronological age, sex, and physical development.

The accepted bases of speech education—articulation, voice, and rate—should be provided for in any language arts program.

The problems in articulation are those of sound, enunciation, and pronunciation. These factors must not be left to incidental teaching but special time must be devoted to correcting any weaknesses which may exist.

The control and use of the voice is particularly important at this level of social and emotional maturity. The range of pitch, the tonal quality, the volume are all areas which need to be stressed.

Speech in the intermediate school may be most effectively taught in correlation with all areas of learning. The workbooks suggested in the bibliography contain many suggestions for specific lessons.

In the severe speech disorder cases, the classroom teacher may best help in providing an environment which (1) relieves nervous tension, (2) helps the pupil in maintaining a realistic attitude toward his handicap, (3) provides sufficient practice situations for the stutterer before his class presentation, and (4) co-operates with the therapy recommended.

Attention is called to a bibliography on speech problems at the end of this section.

## LISTENING.

Although the language art of listening is the one most frequently used in and out of school, it is also the one most neglected. What can be done to train the children in grades 4, 5, and 6 to be critical and intelligent listeners? First, there is a need for greater awareness on the part of all, not only of the increasing amount of listening today but of the tremendous impact of the spoken word.

Second, there is a need for careful study of the listening habits and abilities of children. Questions such as these deserve and require the same intensive study that reading has received:

1. How widely do pupils vary in their ability to learn through listening?
2. What is the range of their listening ability?
3. What proportion of our pupils are so retarded as to require remedial instruction?
4. How important are such factors as auditory acuity, interest, speed of speaking, voice quality and personality of the speaker, emotional stability of the listener, mannerisms, and organization?

Third, classroom teachers can improve the art of listening by providing a better listening climate than now exists in the schools.

Fourth, the schools should provide direct and systematic instruction in listening comparable to that which is now provided in developmental and remedial reading.

Although to whom we listen is of great importance, to what we listen is no less important. Why does anyone listen? We may listen because we want the information we can get through listening. We may need to know specific directions and descriptions. Some esthetic experiences can best be enjoyed through hearing them. Sometimes we need to evaluate what a speaker is saying and sometimes we need to evaluate the way of saying it. If we are able to defend our points of view, we must hear what is said by those opposing them. At times we feel a responsibility for helping to reach conclusions. Active listening and a felt need complement each other in the same way that passive listening and inattention go hand in hand.

Undoubtedly in a schoolroom there will be times when a listening activity can serve no real purpose for certain individuals, when to insist on their listening may foster poor listening habits. Unless the pupil feels an intrinsic interest in, and a need for hearing what is being said or read, he may escape into daydreams. He will listen to his fellows or the teacher when a personal need is being satisfied or he feels a responsibility for the welfare of the group.

The following questions may serve as guide posts for planning listening activities:

1. Which of the pupils need to hear what will be said?
2. Who in the group most needs the experience of saying it?
3. Is the purpose for listening clear to the prospective listeners?
4. What particular listening skills are necessary in this type of listening?
5. What outcomes can be expected from this activity?
6. What is the teacher's function in this learning situation?

If we think through these six points, we shall see that often with the help of the pupils we shall need to plan other learning experiences for those not in need of this verbal and auditory practice.

But planning to meet individual needs and establishing a purpose for listening are not enough. Boys and girls, sitting row upon row, facing the back of someone's head, are scarcely in a position to listen to one another. Listening should be a face to face experience, for facial expression as well as what is said helps us to communicate with each other.

What activities promote good listening habits? Pupils and teachers planning activities together are practicing speaking and listening. We need smaller doses of lectures and long reports and much more group discussion. Several small committees experimenting, investigating and doing research will provide many more persons active participation. Creative experiences in painting, music, dramatics, and writing can provide topics for conversation. We give the students more



appreciational experiences in fine and graphic arts, great music, and literature. And we can help by getting them to explore individual and group interests. Listening can be an important factor in all these experiences. Overemphasis on any one may ruin its effectiveness. Life makes many demands upon us for many types of listening skills.

While learning to listen well cannot alone bring about the changes we hope to see, broader and richer learning experiences may. An enriched curriculum may increase interest in and curiosity about our democratic heritage, cultural background, science, current events, social problems, government and the social process.

With the thought in mind that listening is only one way through which learning takes place, let us summarize how we, as teachers, can use listening as an important part of the language arts program. We should listen and think more about who should be the speaker and who the listener; we should carefully study the worth of those things to which we have the children listen. Children should know how to listen, why to listen, and to whom they should listen. We must examine our classroom practices and plan to use those that most effectively establish good listening habits. The best evaluation of our educational program is in the changing behavior we are able to observe. We shall never be able to evaluate a listening program in isolation, but only as a part of a larger whole. We believe that learning to listen intelligently is the area in language education that has been most neglected. We believe that our listening education quotient is below par. We believe that we can improve the quality of our teaching by giving careful consideration to the listening aspect of language. And we believe as teachers become sensitive to this need for giving "listening" a square deal we will see changes in our educational products.

#### INTEGRATION.

The Guide is based on the point of view that the language arts objectives are most effectively achieved by the integration of language activities with content subjects rather than by isolated drill on skills. Language functions during the child's entire day, and is better taught in an integrated program than in isolation.

The terms correlation, fusion, and integration are loosely used in discussing connections between various subjects in the school curriculum. **Correlation** may be a casual attempt to relate material; for example, noting while teaching a use of the capital letter in proper names those names in the history lesson. It becomes more functional when materials of one subject are used in the advanced planning of either the teacher or the class (or both) to solve a problem or discuss a topic in another subject; for example, a note of invitation in connection with the working out of a science experiment. **Fusion** designates a combination of two subjects taught by the same instructor and given equal attention, though one is usually more weighted than the other—such as the blending of history and literature as found in the study of the myths. **Integration** is the unification of all those study and learning activities which are needed to meet the needs and abilities of the class in solving a certain problem. The value of any attempt at these relationships depends greatly upon the teacher's knowledge and judgment.

#### CREATIVE ABILITY.

Creative self-expression, with appreciation, leads to the fulfillment of personality. In order to be creative, it is not necessary that the child produce something actually new; in fact, the amount of newness in his endeavor may be small. His "story" often consists of a rearrangement of familiar elements in a form more pleasing to him, and more peculiarly his own. If encouraged, he will often add some personal thought or feeling, or express some relationship that may not be new in itself, but nevertheless has originated at this time with him. This gives him great satisfaction, and an incentive to continue to think and to express his own ideas. The teacher must be prepared to develop the potential creative ability latent in every child. She must build the richest possible

background of experience, and cultivate an atmosphere of confidence, security, enthusiasm, and helpfulness.

There are generally three types of pupils for whom the teacher must plan. The first type is the child who responds to the incentive at once with such eagerness that it serves as sufficient stimulus. This child should be permitted to work with no check at the outset. The second type needs encouragement and must be helped to work in that form which he chooses. The third type needs definite help and for him the teacher should set up very limited aims, such as, sometimes actually writing the oral expression.

In the references included in the bibliography at the end of this section will be found many illustrations.

#### USES OF LANGUAGE IN THE DAY OF A FIFTH GRADE CHILD.

Note: Two fifth grade teachers on the committee which prepared this chapter arranged to collaborate in listing the language expression of children in a day at school. One visited the school room of the other and noted the activities. The observations and comments of the visitor are given in the following account. The aim of the account is to show how many language activities are interwoven in the day's work, to be used by the teacher if she is alert.

##### **Before School.**

The children, upon entering the room, gravitated to certain centers of interest. At the "science table" they handled and examined the collection of shells common along the New England coast. They looked over the questions left on the table and wrote others.

Two boys carefully painted glass slides for a lantern slide talk on a book they had both enjoyed. They suggested, criticized, selected, and evaluated ideas while others looked on, asked questions, and commented.

A boy brought a copy of a magazine that had two pages of pictures of shells. The children grew excited as they identified their own.

Another group talked about pictures brought from the library by a classmate.

At nine o'clock the children hold their daily planning period. The theme of the day is Thanksgiving. Each group discovers appropriate stories and poems. All need guidance and direction; one needs help in character and analysis; main ideas with supporting details are to be stressed in another group; all, however, work toward a common goal. All plan how they can tell briefly, yet adequately, what Thanksgiving meant to the people in the story.

##### **The Classroom Teacher Comments.**

Much of the time the child and adult communicate orally.

Children will talk naturally and adequately if they have something worth talking about. They will learn to express themselves clearly when they want their companions to understand them. With varied interests, vocabularies enlarge and new ideas emerge.

Children must share in the planning.

Creative thinking can be fostered only in such an environment.

##### **The visitor enters, observes the activities, and notes the language outcomes.**

###### **Activities.**

Jean, a fifth grader, introduces herself and provides for the visitor's comfort. At intervals, individuals passing by greet the visitor in a friendly manner and introduce themselves.

###### **Language Outcomes.**

Training in the use of everyday courtesies is an important part of the Language Arts program.

These children had previously learned

1. How to greet visitors.
2. How to introduce a visitor to a class, a young person to an older person, and a girl and boy.

**Activities. (Cont.)****Reading.**

A group discusses a story about Thanksgiving.

1. In discussing how to speak in a group, the majority choose to speak rather than to raise hands.

2. The group refers to their chart, "Rules of Conversation".

3. Other meanings are discussed for words encountered in story.

4. The word "brag" is discussed.

Michael thinks it means a game. How can we find out?

Bruce finds word but confuses **bag** with **brag**.

After meaning is found, a "boasting match" is proposed.

Evidences of boasting are found in the story by reading it silently.

5. Multiple choice comprehension check on the story is given.

**Reading.**

Another group reads two Thanksgiving poems and a story.

1. Class describes one of the poems.

2. Individuals read the poem orally.

3. The group criticizes its own performance. They decide they were too serious. How can they make it sound funny? They suggest a change in tone of voice. They then re-read the poem.

4. What does the poem suggest?

5. One poem told how a child enjoyed Thanksgiving. The class write to tell how they spend Thanksgiving.

**Reading.**

Another group reads a different story about Thanksgiving.

**Seat Work.**

1. A story is read silently.

2. A study is made of new words met in the story.

**Language Outcomes. (Cont.)**

1. Courtesy in conversation requires that one person speak at a time; if two start at once, one must say "Excuse me".

A conversational tone should be used.

2. Vocabulary is enlarged by synonyms.

3. Dictionary is used, and parts of dictionary, guide words, finding a word, and choosing appropriate meaning are emphasized.

Vocabulary is developed through speech, dramatizing, and application of meaning to new situation.

4. Written directions are followed.

In this assignment there is provision for individual differences.

1. In the discussion and oral reading there is care in interpretation, pronunciation, enunciation, and expression.

2. Discussion gives opportunity for evaluation and constructive criticism.

3. Re-read for enjoyment and appreciation.

4. Critical analysis and judgment are used.

5. Writing an original poem gives opportunity for creativity.

The emphasis is on vocabulary.

1. Each child uses a dictionary to select meaning in context and write it in his own words. He gains practice in parts of the dictionary and guide words, syllabication and accent, as well as in selecting an appropriate meaning.

**Physical Education: Organized Play.**

The captains have selected a game which fails to meet group approval. Other suggestions are offered with reasons. The class votes.

**Group Reports on Morning's****Reading Activities.**

1. Group share a poem by reading it.
2. Group II share a story with the class by telling it.
3. Group III retells their Thanksgiving story.
4. The class summarizes in answer to the question, "What did Thanksgiving mean in each of the stories?"

**Arithmetic.**

1. Class sees need of an envelope. Different members try to make one, but decide that directions are needed. Teacher gives written directions.
2. Class needs oral directions when measuring.

**Activities. (Afternoon)****Art Activities**

1. Thanksgiving greeting card. Children review messages already composed, and make new ones. Class discusses covers, and how to make them individual.
2. Class makes a story of the Pilgrims to mount and display. Children discuss pictures and story, and divide into two groups.

**Plans for Next Day.**

Groups decide on needed activities, and class organizes and records them.

**Rhythm: Virginia Reel.**

Review of directions precedes the dance.

This fifth grade day indicates that Language Arts enter into every activity. In the modern school, well-planned integrated experiences produce the need for learning to think, to read, to

Conducting a discussion with respect for the rights and opinions of others is democratic. The group abides by the will of the majority.

**Language experiences are**

1. Audience-type reading.
2. Audience listening.
3. Story-telling, including selecting interesting and important items, choosing appropriate words, being aware of sentence structure, arranging ideas in order, using English correctly.
4. Audience listening.
5. Additional outcomes. Selecting major ideas and arranging in logical order. A good closing paragraph.
6. Discussion, critical analysis, judgment, evaluation.

1. Individuals explain what they have done.
2. They follow oral and written directions, gaining practice in listening.

**Language Outcomes.**

Creativity is needed.  
Ethics: one uses another's composition only by permission.  
Children recall and apply "Rules for Conversation".  
They suggest and arrange a simple outline for the story.  
Spelling and punctuation needs arise.

Organization, oral presentation, clarity, and courtesy are needed in discussion.

Oral recall of what has been heard is organized in sequence.  
Directions of the "caller" are heard and followed.

speak, to listen, and to write effectively. When the skill has been taught, there must be ample provision for practice and application.

## THE PLACE OF LANGUAGE IN UNITARY TEACHING.

Occasionally a unit is organized around a language center, when the main outcome is to be a literary program, a collection of original stories and poems, or something similar.

More often the unit is centered in some other field, such as science, or social studies, but includes many necessary language activities, since language is the most common medium of communication.

In order to show the important language activities in almost any unit, the following outline of unit procedures is presented, somewhat abbreviated from an outline used in the schools of Melrose, Massachusetts.

## A SUGGESTED FORM FOR UNIT PROCEDURES.

A test of language power comes in a situation which is real and live, and in which each pupil feels a necessity for transmitting his thoughts in a well organized form which compels attention, interest, and understanding by his listeners.

### 1. Choosing a Unit.

The interests of the class are investigated through conversation and discussion. One interest which is most wide spread and which also is found among the lanes of subject matter prescribed for the grade is chosen. Teacher guidance is strong to insure gain to individuals and to groups; to be sure the subject matter is within the understanding and the requirement for the grade level; and to see that the entire unit is worthy of the time spent. Thus there is a balance of types of units chosen so that interests of all pupils may be satisfied during the year.

### 2. Planning the Unit.

- a. Deciding what we want to know.  
Questions or topics are stated and placed on the board.  
References are listed with other suggestions for helps.
- b. Deciding what we want to do with the information.

Suggestions are made for necessary committees; how they shall operate; what type of presentation shall be made (oral reports, lantern slides, construction, mural, play, pageant). The decision is based on what type of activity the class has carried on previously and upon the importance of the subject matter of the unit. The time element is an important factor in the choice.

### 3. Carrying on Committee Work.

- a. At the first of each year, or at any time to improve committee work, the teacher acts as chairman, with the whole class working together as individual members of one committee. Thus the teacher has opportunity to demonstrate the duties of a chairman and to know that each pupil understands the procedure in committee work. In each case, reports are given by each pupil. The Chairman may preside or not, as desired, but is responsible for moving the reports along. He is also responsible for knowing the content of each report, for helping to avoid duplication and for completeness of topic presentation.

- b. Personnel of the committees is chosen.

By teacher decision, by pupil choice, or by the type of committee service a pupil has done previously.

- c. Plans for research are made within each committee.

Materials are designated to be used by each pupil member, subtopics are determined,

each member chooses or is assigned a subtopic, and opportunity is arranged to share and to exchange material.

d. Individuals carry out their assignments.

By reading, using visual aids, or listening.

e. At the end of each working period, committee members pool their resources, and chairman checks the accomplishment. Plans for the next step are made.

f. Teacher is free, either to meet with a committee that needs and requests help, or to help an individual, or to check progress made in each group. Sometimes real reading help must be given to slow learners. Outlining, and topic unity must be taught.

g. An important requisite for success is for each group, from time to time, to do constructive criticism of its accomplishment and to plan improvement.

h. Opportunity is given for creative or construction work—either by individuals, or by all committees together, if a class product is to be presented.

i. Check tests are made, by each individual in the group presenting questions on the important points of his report. The chairman or a designated member co-ordinates these questions, and presents them to the class after the report is made. This insures listening on the part of individuals in all groups.

#### 4. Culminating Activity.

a. Reports given by each group, using illustrative material made or collected.

b. Presentation of a play or slides, etc., to a chosen audience.

c. Discussion of subject matter used, with its implications in our own lives.

#### 5. Recapitulation by Teacher.

a. Check test if it is an informational unit.

b. Discussion if it is a unit of appreciation.

#### 6. Clearing Away.

a. Constructive criticism of committee workings and accomplishments.

b. Suggestions for improvement as a whole and for individuals.

c. Return of materials to proper places.

### LANGUAGE OUTCOMES IN A UNIT

The following language outcomes can be found over and over in the units in the other sections of this Guide. When these situations are used by an alert teacher they furnish opportunity for teaching most of the language skills.

**Listening:** Children listen to records, to reports of committees, to stories, to quiz programs, to assembly programs, to poems, to directions, to criticisms, all for the definite purposes of enjoyment, remembering, evaluation, or other specific results.

**Speaking and reading aloud:** Children give or read reports, use telephone, tell or read stories, give directions, take part in informal or planned discussions, plan work with committee or class, present and take part in programs, use choral speaking, interview people, explain collections of pictures or curios, introduce people, make and present plays and puppet shows, plan and give real or imaginary loud-speaker talks, act as guides, etc.

**Writing and spelling:** Children write letters of all kinds, reports, original stories and poems, real and imaginary descriptions, accounts of excursions, diaries of work, labels and explanations for pictures, program schedules, plans of work, notes and outlines of material heard or read, notebooks, book reviews; they keep lists of words learned, of places, of people, and of many other things; they collect, arrange, label, and write descriptions of all sorts of illustrative material, and fill in forms of all kinds.

**Reading:** Besides the obvious need of reading much material in connection with every unit for information and pleasure, together with the cultivation of the reading skills involved, the children will learn to read timetables, graphs, diagrams, tables and schedules of all sorts, outlines, money-orders, pictures, directions, maps, price-lists, simple science data, and much miscellaneous material.

#### SUGGESTED LANGUAGE UNITS.

Occasionally a unit centers around language. Such units might be as follows:

Collection and presentation of Christmas stories and poems.

A book of original verse.

An illustrated, or illuminated, class book of favorite poems on some subject. The poems might be written or lettered.

A library corner, with librarian, bulletin board, etc. A Library Club, with story-telling, reports of reading, and programs.

A Choral Reading Group.

A letter exchange with children in another country.

A play, shadow-graph, or puppet show.

A program for parents.

#### SKILLS.

Development in ability to deal with language is gradual within each pupil. The idea that certain skills have to be mastered in a given grade by all children has disappeared. Continuity of experience is necessary if the child is to deal with situations on an increasingly complex level. However, in too many activity programs experiences offered do not provide for continuity of development.

Pupils must be in possession of certain skills before they can carry on effectively in a language arts program. The inclusion of a detailed Skills Chart organized on levels of ease and accuracy in correct usage may help teachers to recognize the skills development in composition, grammar, and spelling. The following chart is adapted from the Teachers' Guide in Language Arts, Brockton, Massachusetts, 1949.

**OVERVIEW SKILLS CHART IN LANGUAGE ARTS.**

Note: Many skills are developed over the years. No one teacher is responsible for all skills but each teacher is responsible for continued growth in all areas. In the following chart it is understood that the SKILLS mentioned under PRIMARY GRADES are continued throughout the INTERMEDIATE GRADES.

SKILLS BEING DEVELOPED IN THE PRIMARY GRADES.		ADDITIONAL SKILLS TO DEVELOP IN GRADES 4, 5, and 6				
		4	5	6		
LISTENING	<p><b>How to Listen.</b>                      Listening attentively and courteously.                      Listening with appreciation.                      Listening for directions.</p> <p><b>Teacher Preparation for Listening Situations.</b>                      Motivating material to be presented.                      Correlating with present interest.                      Presenting vocabulary to be used.                      Discussing the value of note taking.</p> <p><b>Active Listening.</b>                      Using directing questions for informational material.                      Following the rules of good listening.</p> <p><b>Follow-Up Activities.</b>                      Carrying out directions or instructions.                      Asking questions about what was not understood.                      Discussing material.</p>	<p>Listening to evaluate material.                      Listening for new words and phrases.</p> <p>Same as primary.</p> <p>Taking notes during broadcasts.                      Recordings, special reports, or lectures.</p> <p>Using notes or directing questions.                      Discussing material.                      a. Relating new materials to personal experiences or to previous knowledge.                      b. Evaluating and organizing new materials.</p>				
	ORAL COMMUNICATION	<p><b>Speaking Situations.</b>                      Using pleasing inflection and intonation.                      Having good posture when sitting or standing, avoiding mannerisms.                      Speaking distinctly, slowly, and with proper volume for the situation.                      Participating enthusiastically in discussions.</p>	<p>Developing poise and assurance.</p>			



SKILLS BEING DEVELOPED IN THE PRIMARY GRADES.		ADDITIONAL SKILLS TO DEVELOP IN GRADES 4, 5, and 6			
		4	5	6	
ORAL COMMUNICATION	<p><b>Thinking Situations.</b> Thinking before speaking. Developing ability to use a complete sentence. Recognizing humor.</p>	Observing the courtesies of polite conversation.			
		a. Including everyone in the group.			
		b. Making others feel at ease.			
		c. Refraining from monopolizing the conversation.			
		d. Knowing the polite way to interrupt a person.			
		e. Expressing politely conflicting opinions.			
		f. Being a good listener.			
		Using correct forms of verbs: take, bring; lie, lay; sit, set; leave, let; have, get.			
		Avoiding double negatives.			
		Correct use of in, into; these, those, them; between, among; good, well.			
		Gaining the ability to distinguish between phrases and sentences.			
		Taking part in panel discussions.			
		<p>a. Emphasis on correct use of pronouns—John and I; his father and he; for Tom and him.</p> <p>b. Avoiding excessive use of "and".</p> <p>c. Verb forms: is, are, isn't (not ain't); come; see; do; go; give; run; was; were; can; may; doesn't don't; teach; learn.</p> <p>d. Avoiding double subject —"My brother, he."</p>			
		Gaining in ability to use longer but well-constructed sentences.			
		<p><b>Story Telling.</b> Having something to talk about. Observing the details of a picture.</p>	Selecting an interesting and suitable title.		
			Giving oral book reviews.		
		Keeping to the subject.			
		Telling humorous stories.			
		Using notes and outlines as guides.			
		Condensing a story before re-telling it.			

SKILLS BEING DEVELOPED IN THE PRIMARY GRADES.		ADDITIONAL SKILLS TO DEVELOP IN GRADES 4, 5, and 6	4	5	6
ORAL COMMUNICATION	<p>c. Planning good beginning and closing sentences.                      d. Keeping the subject narrow.                      e. Planning a proper sequence of events.                      Looking at the audience.</p> <p><b>Poetry.</b>                      Sensing rhythm in poems.                      Reciting simple poetry.                      Making and enjoying rhymes and verses.</p> <p><b>Announcements, Explanations, Directions.</b>                      Knowing the information that should be given.                      Developing the ability to recall accurately.</p> <p><b>Telephoning.</b>                      Knowing how to use the equipment.                      Knowing how to answer a call.                      Calling an adult to the telephone when the message is important.                      Talking naturally.                      Showing courtesy while the phone is in use.</p>	<p>Reading poetry aloud for enjoyment and appreciation.                      Developing skill in choral reading.</p> <p>Giving directions clearly.                      Eliminating unnecessary details.                      Explaining illustrations, exhibits, and maps to enrich meanings.                      Organizing the information in logical order.                      Conducting a club meeting.                      Selecting material wisely.</p> <p>Knowing how to conclude a conversation.                      Being sure to have the correct number.                      Repeating the message accurately.                      Using the telephone courteously.</p>			
WRITTEN COMMUNICATION	<p><b>Letter Writing.</b>                      Knowing what should be included.                      Simple salutation, message, ending.                      Writing and answering an invitation.                      Writing letters of thanks.                      Copying correctly.                      Using good handwriting.                      Having good sentence sense.                      Copying an address correctly.                      Knowing how to fold a letter.                      Addressing the envelope.                      Composing original letters.</p>	<p>Addressing the envelope with return address.                      Learning the five parts of a letter by name.                      Correct placement of parts.                      Writing business letters.</p>			

SKILLS BEING DEVELOPED IN THE PRIMARY GRADES.		ADDITIONAL SKILLS TO DEVELOP IN GRADES 4, 5, and 6		
		4	5	6
WRITTEN COMMUNICATION	<b>Capitalization.</b>			
	First word in sentence.			
	Personal pronoun "I".			
	Child's own name.			
	Name of school.			
	Initials.			
	Child's own address.			
	Name of month.			
	Abbreviations: Mr. and			
	Mrs.; Dr.; St.; Ave.; Mass.			
	Names of days of week.			
	Lines of poetry.			
	<b>Writing Stories, Poems, Reports, Riddles.</b>			
	Thinking before writing.			
	Using correct capitalization.			
Writing legibly and neatly.				
Copying accurately.				
Developing good sentence sense.				
Avoiding excessive use of "and".				
Indentations.				
Arranging lines of poetry.				
Placing each sentence in logical order.				
Choosing expressive, vivid words.				
<b>Using Dictionary.</b>				
Alphabetical arrangement.				
	<p>Special days.</p> <p>Particular persons, places, things, nationalities.</p> <p>Titles of stories, books.</p> <p>First word of greeting, closing.</p> <p>Words referring to the Deity.</p> <p>Titles of people.</p> <p>Direction of compass used as name.</p> <p>Writing labels for display.</p> <p>First word in quotation.</p> <p>Topics in outlines.</p>			
	<p>Choosing a title of interest.</p> <p>Ending a story in a satisfactory way.</p> <p>Using dictionary. Diacritical marks: long and short vowels; understanding accent marks; syllabication; using guide words; selecting pertinent meanings.</p> <p>Finding own errors.</p> <p>Hyphenating words at end of line.</p> <p>Writing creative poetry.</p> <p>Correct use of table of contents, index, reference books.</p>			
	<p>Use of antonyms. Samples: sad-happy; neat-untidy; tiny-huge; cruel-kind; gently-roughly; forward-backward; generous-stingy; collect-scatter; deep-shallow; employer-employee; happy-unhappy; descent-ascent; careless-careful.</p>			
	<p>Use of synonyms. Samples: answer-reply; let-allow; begin-commence; queer-odd; choose-select; polite-courteous; funny-amusing; put-place; completed-finished; often-frequently; rich-wealthy; under-beneath; fast-rapidly.</p>			

SKILLS BEING DEVELOPED IN THE PRIMARY GRADES.		ADDITIONAL SKILLS TO DEVELOP IN GRADES 4, 5, and 6		
		4	5	6
WRITTEN COMMUNICATION	<p>Use of homonyms. Samples: to-two-too; knew-new; blew-blue; their-there; know-no; hear-here; by-buy; threw-through; ate-eight; write-right; sea-see; steel-steal; so-sew-sow; plain-plane; rode-road; scent-sent-cent; sale-sail; week-weak; hair-hare; flower-flour; pear-pare; pale-pail.</p> <p>Writing new stories, personal experiences, jokes, announcements, diaries, plays, for class newspaper.</p> <p>Writing committee reports.</p> <p>Writing own birthdate.</p> <p><b>Making Book Reports.</b>                      Writing title of book.                      Writing name of author.                      Expressing one's own reaction to what is read.</p> <p>Avoiding choppy sentences.                      Making good opening and closing sentences.                      Using statements, questions, and exclamations.                      Improving sentences, using variety in order of sentence parts and beginnings.                      Teaching subject and predicate.                      Agreement of subject and predicate.                      Recognizing parts of speech.                      Using simple and compound subject and predicate.</p> <p>Period: After abbreviations of states, countries, continents, points of compass, Pres., Rev., Gov., Supt., Co., Jr., Sr., P.S., Hon., Maj., Prof., Gen.                      After numbers and letters in an outline.                      None after titles of stories.</p>			
	<p><b>Filling in Forms.</b>                      Writing own name.                      Writing numbers.                      Writing name of school.</p>			
	<p><b>Sentence Structure.</b>                      Avoiding "and" habit.                      Building complete sentences.</p>			
	<p><b>Punctuation.</b>                      Period: At end of sentence; after numbers in a list; after initials; after abbreviations: Mr., Mrs., Dr., St., Ave., Mass., A.M., P.M., months, days of week.                      Using question mark at end of a question.                      Commas: After greeting in a letter; in writing dates.</p>			



	DISCUSSION PRESENTATION	Accepts suggestions gracefully.					
		Knows the source of his information.					
		Leads listeners to add their ideas.					
		Speaks clearly in discussion.					
		Gains information and ideas.					
		Is attentive and pleasing in his attitude.					
		Understands the points presented.					
LISTENING		Accepts answers with grace and understanding.					
		Asks questions that are valuable.					
		Contributes vital points.					
		Is appreciative of the speaker.					
	Speaks clearly and to the point.						
	Uses good judgment in contribution and suggestion.						

GROUP WORK AFTER TAKING AN INVENTORY.

At the beginning of the year, a diagnostic test in the form of a written composition of the personal experience type may be given. Pupils are then divided into groups according to needs for skill improvement. The classification may be sentence sense, and variety of sentence structure; beginning and ending sentences, showing sense of composition; title and main thought, showing organization; and correctness and variety of word usage.

It is not practical to attempt to have too many groups at once. Checking becomes too complicated and it is vital for the teacher and pupils to know the progress made each day.

The following outline of study illustrates one technique for planning group work for one week. From a study of the pictures on the bulletin board we planned to write stories. Three groups are formed according to ability and need.

## TEACHER'S SCHEDULE.

Day	Group I (slow)	Group II (average)	Group III (superior)
Monday	<b>Teacher</b> works with group on interesting titles suggested by the pictures.	Group write lists of descriptive words about their pictures.	Group look up material to get ready to write their story.
Tuesday	Group pick out most interesting titles from list given them. Write two or three original titles.	Group work with <b>teacher</b> on good beginning sentences trying for a variety in natural expression.	Group write the stories.
Wednesday	<b>Teacher</b> works with all groups; listens to stories of Group III; offers suggestions for words, etc. Group I gain ideas for their stories.	Group II gain ideas for their stories.	Group III plan changes and improvements.
Thursday	Group I work with <b>teacher</b> to develop sentence sense and structure of the written story to go with the selected title.	Group II write stories.	Group III help any in Group II who may need it. Finish their stories.
Friday	<b>Teacher</b> works with all groups—listening to work of group I and II for further suggestions and evaluating stories of Group III.		

**SPELLING.**

Perfection in spelling cannot be expected; but a child completing the sixth grade should be secure enough so that his spelling skill makes his written work socially acceptable. Teachers should plan to meet the needs of the individual pupil; teach only the words and rules that the pupil is mature enough to understand and apply; encourage each pupil to compile an individual list which he will need in all his writing, and to keep a record of his own progress.

There should be used both the direct method (a definite time set aside to teach the scientifically prepared lists which suit groups in the class) and the incidental method (instructions in connection with all the pupil's writing in other activities).

There are many well prepared lists and study procedures and most manuals have well-stated expectancies for the normal group in any grade. The following is suggestive.

## EXPECTANCIES AT END OF GRADE

Grade Four	Grade Five	Grade Six
Can spell satisfactorily—the basic list of words on which he has worked.	Same.	Same.
Desires to spell correctly in all written work.	Shows growth in this desire.	Is alert to correct spelling.
Knows and uses some spelling aids.	Uses more aids.	Uses aids independently.
Can arrange words alphabetically.	Grows in alphabet skills.	Grows in alphabet skills.
Uses the dictionary.	Uses the dictionary.	Uses the dictionary.
Checks his written work for misspelled words.	Has greater sensitivity.	Is independent in word study techniques.
Keeps a list of his own difficulties in spelling.	Continues to work for mastery in his own list of difficulties.	Uses preventive measures to conquer difficulties.

**HANDWRITING.**

Writing is a means of communication and recording and is not an end in itself. By the end of the sixth grade a pupil should have increased his skill in the use of this means toward a smoother and better controlled movement and a more regular and mature form. He should be conscious of his own difficulties and have a desire to improve them until they are socially acceptable.

Teachers should recognize the physical development of the hand (in the sixth grade it may have reached its mature size) and the balance in the physical and the emotional side of the pupil in assigning work.

Teachers should have acceptable handwriting scales and make them available to children for use in analyzing their own handwriting.

The scope of handwriting is as wide as is the need of the pupil. Pupils use both cursive and manuscript writing and may well learn to use in school all types of writing instruments.

The emphasis in handwriting instruction is placed upon legibility and use rather than upon perfection. To improve in all functional writing the pupil needs to work as often as he requires under careful direction.

There are many standard manuals and services which teachers may use.

**INSTRUCTIONAL AIDS.**

Materials of instruction are necessary to carry on an effective language arts program. Such material can be found in commercial sources of material, including teacher texts, other curricula, test materials, check lists, and skills presentation suggestions.

In the use of text books, success depends upon the craftsmanship of the users (teacher and child), with the power of the master craftsman in the teacher. This tool must be used in harmony with the purposes of all concerned. There is enough similarity in current books on the market so that once a choice is made, probably the best results will be obtained for most of the class by following the sequence therein in so far as it meets the needs of the group. Supplementary books can well be used for particular cases and for teaching aids.

**FLEXIBILITY.**

It is recognized that great individual differences exist within each school system and that school systems differ widely from one another in Massachusetts. Responsibility for the execution of the language arts program does not lie wholly within the classroom teacher's jurisdiction. In this discussion there has been a deliberate attempt to avoid many so-called daily schedules, grade-designations, and time allotments.

**SUMMARY.**

The emphasis in this section of the guide is on the building of fundamental attitudes, habits and skills rather than on isolated factual material in the language arts. The teacher is encouraged to adjust her work to meet the facilities offered by her community, administrators, class, and herself. It is hoped that each teacher will use the suggestions to dovetail with her particular situation. It is hoped that she will accept the challenge of this changing concept in Language Arts; because language functions in all areas of living and learning in society, there must be school experiences requiring the use of language at the child's level of comprehension. From these experiences should emerge the natural communication of children in developing power to secure and express ideas through the mother tongue.



## BIBLIOGRAPHY.

**General References (exclusive of Reading).**

- Averill, Lawrence, A. THE PSYCHOLOGY OF THE ELEMENTARY SCHOOL CHILD. New York: Longmans, Green & Co., 1949. Chapter 7.
- Beery, Althea. "Listening Activities in Elementary School." THE ELEMENTARY ENGLISH REVIEW, xxiii-2, February, 1946.
- Braun, Irwin H. LAUGH AND LEARN GRAMMAR. San Francisco: Harr, Wagner Co., 1943.
- Brockton Public Schools. TEACHERS GUIDE IN LANGUAGE ARTS. 1949. Brockton, Massachusetts.
- Cody, Sherwin. COACHING CHILDREN IN ENGLISH. New York: Good English Publisher, 1944.
- Dawson, M. A. A COURSE OF STUDY IN LANGUAGE, GRADES ONE TO SIX. New York: World Book Co., 1949. (Small pamphlet.)
- Detroit Public Schools and Wayne University. DEMOCRATIC CITIZENSHIP AND DEVELOPMENT OF CHILDREN. 1949.
- Dolch, E. W. BETTER SPELLING. Champaign, Illinois: The Garrard Press, 1942.
- Findlay, B. A. SEE YOUR GRAMMAR. New York: N. Y. University Publishing Co., 1947.
- Hildreth, Gertrude. LEARNING THE THREE R'S. Minneapolis, Minnesota: Educational Publishers, 1936, 1947.
- Hildreth, Gertrude. CHILD GROWTH THROUGH EDUCATION. New York: Ronald Press, 1948.
- Hockett, J. A., and Jacobsen, E. W. MODERN PRACTICES IN THE ELEMENTARY SCHOOL. Boston: Ginn and Company, 1938.
- Huggett, Millard. GROWTH AND LEARNING IN THE ELEMENTARY SCHOOL. Boston: D. C. Heath and Co., 1947.
- Jenkins, Frances. LANGUAGE DEVELOPMENT IN THE ELEMENTARY GRADES. Thomas Nelson and Sons, 1941.
- Jenkins, Gladys G., Shacter, Helen, and Bauer, William W. THESE ARE YOUR CHILDREN. New York: Scott, Foresman & Co., 1949.
- Jersild, A. T. CHILD PSYCHOLOGY. New York: Prentice-Hall, 1941.
- Jersild and Associates. CHILD DEVELOPMENT AND THE CURRICULUM. New York: Teachers College, Columbia University, 1946.
- Kibbee and others. HANDBOOK OF ENGLISH FOR BOYS AND GIRLS. New York: Scott, Foresman & Company, 1939.
- Leaf, Munro. GRAMMAR CAN BE FUN. Philadelphia: J. B. Lippincott Co.
- Lee, J., and Doris M. THE CHILD AND HIS CURRICULUM. New York: Appleton, 1940.
- Macomber, F. M. GUIDING CHILD DEVELOPMENT IN THE ELEMENTARY SCHOOL. New York: American Book Co., 1942.
- McKee, Paul. LANGUAGE IN THE ELEMENTARY SCHOOL. New York: Houghton, Mifflin, 1939.
- McKee, Paul. THE TEACHING OF READING. New York: Houghton, Mifflin, 1948.
- Norton and Norton. FOUNDATIONS OF CURRICULUM BUILDING. Boston: Ginn and Co., 1936.
- Ohio State University. "HOW CHILDREN DEVELOP". No. E—1948.
- Raubichek, L. HOW TO TEACH GOOD SPEECH IN THE ELEMENTARY GRADES. New York: Noble and Noble, 1937.
- Supervisor's Exchange. THE LANGUAGE ARTS, PART I AND II. Boston: Silver, Burdett, 1946. (Includes Bibliographies of State and City Course of Study.)
- Trent and others. THEY ALL WANT TO WRITE. Chicago: Bobbs Merrill Co., 1939.

- Trommer, C. J., and Regan, Teresa A. DIRECTING LANGUAGE POWER IN THE ELEMENTARY SCHOOL CHILD. New York: Macmillan Co., 1933.
- U. S. Office of Education. "How to Build a Unit of Work." Bulletin 1946—No. 5. Yearbook, 20th. LANGUAGE ARTS IN THE ELEMENTARY SCHOOL. National Elementary Principals Association, 1941.
- Yearbook, 38th. CHILD DEVELOPMENT AND THE CURRICULUM. Public School Publishing Co., National Society for the Study of Education, 1939.
- Yearbook, 43rd. TEACHING LANGUAGE IN THE ELEMENTARY SCHOOL. Bloomington, Ill.: Public School Publishing Co., National Society for the Study of Education, 1944. Part II.
- Yearbook, 28th. EVALUATION OF STUDENT TEACHING. Association for Student Teaching, Lock Haven, Pennsylvania.

### Speech.

- Association for Childhood Education. LEARNING TO SPEAK EFFECTIVELY. Washington, D. C.: The Association for Childhood Education, 1943.
- Ainsworth, Stanley. SPEECH CORRECTION METHODS. New York: Prentice-Hall, 1948.
- Barrows, S., and Hall, K. GAMES AND JINGLES FOR SPEECH DEVELOPMENT. Boston: Expression Co., 1940.
- Buckingham, Thorndike. VOICE AND ARTICULATION. Boston: Expression Co., 1934.
- California State Curriculum Commission. TEACHERS' GUIDE TO CHILD DEVELOPMENT in the Intermediate Grades, Chapter XVIII. Sacramento, Cal., State Department of Education, 1936.
- Cincinnati Public Schools, Curriculum Bulletin 125, Chapter X.
- Cole, Natalie Robinson. THE ARTS IN THE CLASSROOM. New York: John Day Co., Inc., 1940. p. 137.
- Conrad, Lawrence. TEACHING CREATIVE WRITING. New York: D. Appleton-Century Co., Inc., 1937. pp. xii and 142.
- Ferebee, June and others. THEY ALL WANT TO WRITE. Indianapolis: Bobbs-Merrill Co., 1939. pp. xi and 190.
- Hartman, Gertrude and others. (editors) CREATIVE EXPRESSION. New York: Progressive Education Association, 1932. pp. 144-152.
- Hatfield, Wilbur. (chairman) A Report of a Commission of the National Council of Teachers of English. AN EXPERIENCE CURRICULUM IN ENGLISH. Chapters IX, X. New York: D. Appleton-Century Co., Inc., 1935.
- Johnson, Wendell. SPEECH HANDICAPPED SCHOOL CHILDREN. New York: Harper Brothers, 1948.
- Keppie, E. E., Kellar, K., and Wedberg, C. SPEECH IMPROVEMENT THROUGH CHORAL SPEAKING. Boston: Expression Co.
- Lloyd, Pearl. OUR SECOND SPEECH BOOK. Newson & Co., 1947.
- Nemoy, R., and Davis S. THE CORRECTION OF DEFECTIVE CONSONANT SOUNDS. Boston: Expression Co., 1937.
- Powers, D., and Martin, S. YOUR SPEECH (Grade 6). New York: Noble and Noble, 1934.
- Raubichuck, L. HOW TO TEACH GOOD SPEECH. New York: Noble and Noble, 1937.
- Schoolfield, Lucille B. BETTER SPEECH AND BETTER READING. Boston: Expression Co., 1937.
- Schoolfield, Timberlake J. SOUNDS THE LETTERS MAKE. Boston: Little Brown & Co., 1946.
- Van Riper, Charles. SPEECH CORRECTION. New York: Prentice-Hall Inc., 1939.
- Walsh, G. SING YOUR WAY TO BETTER SPEECH. New York: E. P. Dutton Co., 1940.
- Wood, Alice L. SOUND GAMES. New York: E. P. Dutton Co., 1934.

**CHAPTER XII****SECTION 2: READING**

	<b>Pages</b>
<b>Introduction: Directional Reading Goals</b> . . . . .	223
<b>The Modern Reading Program</b> . . . . .	223
<b>Basic Instructional Reading</b> . . . . .	231
<b>Integrative Reading</b> . . . . .	236
<b>Recreational Reading</b> . . . . .	241
<b>Questions Asked by Teachers</b> . . . . .	245

**DIRECTIONAL READING GOALS FOR INTERMEDIATE GRADE CHILDREN.**

Children select reading material to extend concepts of the world; to supply information on social behavior; to build ideas of fair play and adventure; and to provide substance for laughter.

Children become proficient in using reading as a means of acquiring ideas which can be shared with others.

Children enjoy perfecting necessary reading skills when the acquisition of such skills improves relationships with peers.

Children seek reading as a source of group solidarity both in school and out of school.

Children often establish reading interests independent of school or clique related to home-conducted hobbies or interests.

**THE MODERN READING PROGRAM.****Reading in Our Culture.**

Reading is a form of social interaction. The reader acquires information useful to him in life, or he is stimulated to thought and action by the words of the writer. The American culture is a reading culture as witnessed by the sale of newspapers, magazines, and books; the constant output of advertisements of every kind; and the accepted necessity for reading ability in vocational pursuits. Since the national culture recognizes reading as a prerequisite to satisfactory social adjustment, the school reflects the social setting by according reading a place of major importance in the curriculum at every level.

**Reading a Complex Process.**

Success in school is dependent to a great degree upon the ability of the pupil to use reading as an aid in learning situations. Growth in essential reading power depends upon the acquisition of constellations of reading skills, habits, abilities; upon the development of favorable attitudes and appreciations; upon the increasing realization of certain understandings, knowledges, and insights related to learning to read. Reading is a complex process to teach and to learn, as stress must be placed upon the development of the meaning aspect of reading: interpretation, critical mindedness,

assimilation, and use of material read. The definition of reading given by M. Lucille Harrison, in **READING READINESS**, indicates the complexity of the thorough reading process:

Reading is a process of recognizing symbols which serve as stimuli to the recalling and constructing of meaning, accompanied by the manipulating of the resulting meanings in thought processes according to the purposes of the reader, and applying those meanings to his purpose so that his ensuing reactions are modified as a result of reading.

### **Reading, One of the Communication Arts.**

The reading program of the modern elementary school is an integral part of the language-arts program to such an extent that the teaching of reading is inseparable from the teaching of oral language, written language, attentive listening, and critical thinking. The basis for growth in any area of language is the extension of experience. Research points out that it is impossible to make true progress in language development by forcing the child before he is ready physically, socially, emotionally, and mentally. It is futile to try to establish facility in any one phase of language if the pupil has not experienced success in the preceding stage of development. Betts, in the **FOUNDATIONS OF READING INSTRUCTION** presents the Sequence of Language Development:

**Experience** with objects, situations, sounds.

Experience and **listening** to sounds, noises, speech.

Experience, listening and **speech**.

Experience, listening, speech, and **reading**.

Experience, listening, speech, reading, and **writing**.

Experience, listening, speech, reading, writing, and **extension of all**.

The place of reading in the sequence of development carries the implication for teachers at every level that children must be given wide experiences in building concepts, in participating as an interested listener, in contributing through oral language, if they are to make satisfactory progress in learning to read. Reading, in turn, helps children to progress in other forms of communication.

### **Developmental Reading. Basic Premises.**

The developmental reading program in the modern school is made to fit the needs of the individual child, although the instruction may be carried on in small groups. The goal of the developmental program is to establish reading as an intrinsic feature of the child's pattern of living. If the teacher is to achieve this high goal in keeping with the development of the individual child, he must recognize basic premises in the teaching of reading, such as the following:

1. The process of teaching reading at the first and succeeding levels of development entails consideration of the child's mental maturity, his emotional stability, his social adjustment, and his physical condition.

2. Basic needs of the child, the need for security, for recognition, and for satisfactory achievement, can be met through classroom reading activities.

3. A stimulating classroom environment, together with full utilization of school and community resources, facilitates the acquisition of reading power.

4. Reading is one form of communication, an essential part of the language-arts curriculum; the child must be helped to realize the importance of reading in the total pattern of social interaction.

5. Differentiated instruction is necessary if each child is to progress at his rate of learning. (Reading disability cases are often prevented when classes are comprised of about twenty pupils and when the teacher has uninterrupted time to carry out a well-planned program.)

6. Children of sub-normal, or dull-normal, intelligence tend to reach their beginning reading stage at a later chronological age than other children; they reach their maximum reading achievement at an earlier chronological age. Retardation is indicated when highly intelligent children read only on grade level instead of achieving a performance in line with their respective capacities.

### **The Developmental Reading Program.**

In the developmental program there are three main phases which may be named

The Basic Instructional Program — learning to read;

The Integrative Reading Program — reading to learn;

The Recreational Reading Program — extending interests through reading.

These programs may be considered separately for purposes of presentation and organization in this Curriculum Guide, but in actual practice they are closely interrelated. The Basic Instructional Program refers to the continuous teaching-learning procedures geared to help the child in mastering the fundamentals of the reading process. For the most part this instruction is carried on in small-group work so that the teacher may readily recognize the progress and needs of each individual child. The Integrative Reading Program emphasizes the use of reading as a vehicle for learning. These experiences may extend from the making of a reading chart in the first grade to record a trip to a farm home, to carefully organized research in several reference books by sixth grade children seeking to find out more about the doings of the General Assembly of the United Nations. The Recreational Program indicates broad use of library resources, skills, and abilities, in order to build and extend the interests of children through books. The interests may be aligned with recreational or academic pursuits; and children should learn that the school and public library are well-springs of information and enjoyment.

### **Corrective-Remedial Instruction.**

In addition to the overall developmental program of reading instruction, there are two other instructional reading tasks which must be handled by the classroom teacher. One is the organization of corrective instruction in any phase of reading which causes difficulty for an individual or a group. It is a normal situation when the classroom teacher must provide corrective instruction for a changing group of children who make up a small part of the enrollment. The need for corrective help may stem from absence from school, from insecurity in progressing from one level of reading to another, from learning blocks inherent in the low mentality of a slow learning child, or from other factors. The other instructional task involves helping children who present severe reading disabilities as diagnosed by a reading specialist or a psychologist. The classroom teacher must cooperate with the specialist in putting the remedial program to work, but the responsibility for the diagnosis of extreme deviation from normal progress in reading does not reside with the classroom teacher. Only about one per cent of the total school population are classified as remedial cases. Thus the teacher must handle corrective and remedial work in addition to the developmental instruction, if each child is to progress at a rate consonant with his ability and needs.

### **Stages of Reading Development.**

The development of reading power follows a series of stages, a progression which has been described in many different ways by authorities in the field. The statement which follows is that presented by Dr. William S. Gray in the 36th Yearbook of the National Society for the Study of Education. It is used by preference instead of more recent organizations. The divisions as given:

1. Reading readiness stage — usually completed during the first grade;
2. Initial reading stage — usually completed during the first grade;
3. Rapid progress stage — usually completed during the second and third grades;

4. Extension of experience and increase in efficiency of reading — usually completed during the fourth, fifth, and sixth grades;
5. Refinement of habits, skills, abilities, appreciations related to reading — usually begun during junior or senior high school, and continued throughout life.

It is to be stressed that there are no hard and fast requirements as to when these stages are to be reached or completed; the listing above indicates common practice only. In fact, thinking in terms of stages of development for any individual or group of children is valuable because it eliminates the accent upon grade placement in terms of reading achievement. Since the range of reading achievement in any one intermediate grade often becomes so wide as to include five grade levels, it is possible for a sixth grade teacher to work with children progressing satisfactorily in the second, third, fourth, and fifth stages of reading development. Slow-learners working at the third level of reading development as they attend sixth grade must not be considered failures, but children progressing at a rate in keeping with the factor of mental capacity.

The Reading Progress Profile, organized by members of the faculty at Lowell Teachers College and used in the Training Schools there, is included in this section to illustrate individual evaluation of basic reading skills in keeping with the concept of stages of development in reading. The profile is kept for each child as he is performing at a particular level; a new profile is substituted as he achieves at a higher level. A copy of the current profile is sent along to the next teacher at the end of the year, included in the cumulative record.

**READING READINESS PROFILE.**  
**Level One. READING READINESS. (Grade 1)**

	Inadequate	Improving	Adequate
Experiential Background Skills.			
Observes on excursions.			
Is social in classroom.			
Has eye-hand control in construction.			
Co-operates in group activity.			
Contributes from outside sources, home.			

Ideational Facility.			
Converses with children and adults.			
Uses complete sentences.			
Interprets a picture story.			
Interprets a series of pictures.			
Solves simple problems.			
Uses broad speaking vocabulary.			
Pronounces and enunciates correctly.			

Visual and Auditory Discrimination Skills.			
Notes like or different configurations.			
Notes like or different word forms.			
Matches words and phrases.			
Hears similarities in words spoken.			
Hears initial sounds of words.			
Hears final sounds of words.			

Experiential Reading Skills.			
Makes contributions to chart story.			
Relates chart story to oral story.			
Evidences understanding in reading chart.			
Reads from left to right.			
Makes accurate return sweep.			
Reads silently before reading aloud.			
Matches phrases correctly.			
Finds words in phrases.			
Handles reading materials with care.			
Reads new story made from old.			

COMMENTS.

BASIC BOOKS READ.



READING PROGRESS PROFILE.

**Level Two.** BEGINNING READING STAGE. (Grade 1)

	Inadequate	Improving	Adequate
<b>Oral Reading Skills.</b>			
Reads for thought.			
Makes use of picture clues.			
Uses natural expression.			
Makes accurate recall.			
Reads smoothly.			
Uses automatic L to R eye movement.			
Uses correct return sweep.			
Makes few reversals.			
Makes few regressions.			
<b>Silent Reading Skills and Abilities.</b>			
Becomes absorbed in easy stories.			
Makes accurate recall.			
Finds answers to questions.			
Does seat work independently.			
Uses few or no lip movements.			
<b>Vocabulary Skills and Abilities.</b>			
Retains sight vocabulary.			
Observes similarities in words.			
Uses word recognition clues.			
<b>Skill in the Use of Books.</b>			
Handles books with care.			
Turns pages carefully.			
Knows how to find a page.			

COMMENTS.

BASIC BOOKS READ.



**READING PROGRESS PROFILE.**

**Level Three. RAPID PROGRESS STAGE. (Grades 2 and 3)**

	Inadequate	Improving	Adequate
Oral Reading Skills.			
Reads with fluency.			
Uses suitable expression.			
Recalls with understanding.			
Recognizes new word independently.			
Makes uses of punctuation marks.			

Silent Reading Skills.			
Reads from many sources.			
Discusses content intelligently.			
Reads workbook independently.			
Interprets material correctly.			
Increases eye span.			
Develops silent reading speed.			
Eliminates vocalization.			

Vocabulary Skills.			
Recognizes many sight words.			
Knows consonants by ear and eye.			
Knows long and short vowel rules.			
Knows similar endings of words.			
Knows common blends.			
Uses configuration clues.			
Uses context clue.			
Adds prefixes and suffixes.			
Finds little words in big words.			

Skill in the Use of Books.			
Exercises care in handling books.			
Makes use of table of contents.			
Understands page sequence.			
Uses simple research techniques.			

COMMENTS.

BASIC BOOKS READ.

--

READING PROGRESS PROFILE.

**Level Four.** EXTENSION OF EXPERIENCE AND INCREASE IN READING EFFICIENCY.  
(Grades 4, 5, 6)

	Inadequate	Improving	Adequate
<b>Oral Reading Skills.</b>			
Reads fluently.			
Uses natural voice.			
Interprets meaning in expression.			
Uses correct pronunciation.			
Enunciates clearly.			
<b>Silent Reading Skills.</b>			
Adjusts speed to purpose.			
Eliminates vocalization.			
Strives for full comprehension.			
Reduces number of fixations.			
<b>Vocabulary Skills.</b>			
Builds individual vocabulary list.			
Defines sight words.			
Uses phonic clues.			
Uses context clues.			
Uses configuration clues.			
Divides words into syllables.			
Learns to use dictionary.			
<b>Study Skills.</b>			
Decides main idea of selection.			
Selects important facts.			
Outlines material read.			
Combines material from many sources.			
Discusses reading creatively.			
Uses skimming when helpful.			
Uses reference books effectively.			
Interprets graphs, charts, etc.			

COMMENTS.

BASIC BOOKS READ.

--	--

Not only must the teacher recognize the phases of instruction in the broad reading program, and the fact that stages of development must be the basis of evaluation,—she must also understand that each child encounters three definite levels of difficulty in material presented for him to read.

Betts, in *FOUNDATIONS OF READING INSTRUCTION*, names and describes these levels about as follows. He adds a fourth.

Level 1, the independent level, covers the material which the child can read successfully without direction. His comprehension should rate 90%, and his ability to pronounce the words should be 99%.

Level 2, the instructional level, includes the books he can read with 75% comprehension, and 95% pronunciation. Here he needs the teacher's help, and guidance if he is to read successfully.

Level 3, the frustration level, includes reading matter of which he comprehends less than 50%, and in which he can pronounce less than 90% of the words. He should not be expected to deal with such reading matter.

Level 4, the capacity level, refers to books, stories, etc., which the child understands and enjoys when they are read to him. His comprehension should be at least 75%, and he should be able to make use of the information so gained.

If the teacher is aware of the individual child's reading performance in relation to the available reading material, she knows which material is easy for the child—the independent level; which can be used with success under careful direction; which would cause failure; and what the child can understand and use with ease when it is read to him. This information must be put to use in forming groups for self-directed research or extensive reading; for organized work under pupil-teachers; for basic reading instruction under the guidance of the teacher; and in making informal analyses of reading achievement. The teacher can help the child to achieve at increasingly mature levels if she is alert to provide challenging materials for him in relation to the reading task to be undertaken.

### **Evaluation, A Starting Point for Improvement.**

The reading achievement of each individual child is so important to the community that the improvement of the reading program should be a co-operative venture, whether at the intermediate, primary, or secondary level. Improvement depends to a great extent upon the willingness of teachers to examine their classroom practices in the light of research and recent trends in the teaching of reading, with the idea of making changes for the benefit of the pupils participating in the program. A total school-system evaluation program which combines the efforts of teachers, pupils, supervisors, principals, the superintendent, and interested laymen of the community in deciding upon the effectiveness of the reading program, opens numerous avenues for initiating substantial improvements.

## **BASIC INSTRUCTIONAL READING.**

### **Developing Readiness.**

Reading is more than the mere mastery of word recognition; it is constant expansion and refinement of the intellectual and emotional processes of the reader. The sum total of all the contributing factors which are necessary for reading is called readiness. It must be realized that readiness is not alone the problem of the beginner; rather it is the problem of every reader every time he reads. It is not enough to string letters together into recognizable words — the pupil must weave words into a thought pattern that has significance, and the pattern must be woven with ever increasing rapidity and expertness.

The function of a reading readiness program is to provide whatever experiences and activities seem necessary for preparing the pupils to be successful in reading the material at hand.

Guiding readiness activities is a vital instructional task of every intermediate grade teacher. There are two parts to every readiness program, and both should be emphasized in the intermediate grades.

In the first place, much new subject matter enters the field, bringing concepts different from those required for understanding the simple narrative of the primary reading books. In addition, sentences become longer and more complex, details more numerous, and even the form of the printed page in the textbooks often has a different appearance. The alert intermediate teacher will make sure that children have the concepts and can manage the more mature language forms.

In the second place, the experienced teacher knows that not all children in these grades have thoroughly mastered all the fundamental skills; in fact, all children need review and continuation. As a part of her readiness program, therefore, she will provide review and re-teaching, when necessary, of such skills as those listed below.

### READING READINESS SKILLS AND ABILITIES.

#### Language Development.

- Tells own experiences accurately.
- Retells story heard with correct sequence of events
- Describes a picture with adequate detail.

Gr. 4	Gr. 5	Gr. 6

#### Auditory Discrimination.

- Hears phonetic elements in words.
- Recognizes beginning, medial, final sounds.


#### Visual Discrimination.

- Notes likenesses and differences in letters, words.
- Recognizes sounds and names of letters in words.


#### Motor Control.

- Reads from left to right pictures, words.
- Evidences satisfactory eye-hand control.


### Developing Understandings, Attitudes, and Appreciations.

Basic instructional reading involves not only the teaching and learning of several inter-related skills and abilities, but also the encouragement of desirable attitudes, appreciations, and understandings related to the process of reading. Whenever children meet with their teacher for basic reading instruction there is opportunity for developing attitudes of interest, curiosity, respect, and joy in the performance of the reading act; appreciation for beauty in reading style, for the intrinsic value of reading; understanding of the importance of reading as a means of opening the worlds of music, art, drama, and hobbies; and as a means of knowing people whose lives would otherwise be remote because of time, distance, or culture. Ample opportunity for guided discussion in connection with basic instruction is of primary importance if children are to regard reading as a rewarding experience.

### Developing Habits, Skills, and Abilities.

As children integrate all the intricacies of the complex task of reading they become facile in assimilating the total process into their work and play. Basic habits, skills, and abilities are the techniques necessary to smooth reading, to the full performance of the reading process. The list given below includes those techniques suitable for intermediate grade children as they put reading to use in practical situations. The columns to the right indicate grade levels and are left

open for the use of individual teachers and for curriculum groups to check the grade level accomplishment of pupils; it is expected that children of normal capacity will have mastered these habits, skills, and abilities by the end of the sixth grade. The column labeled "Unit" indicates reading techniques utilized during the development of a unit on Aviation which is included in the Integrative Reading section; the numbers refer to corresponding numbers used in the unit plan.

#### BASIC HABITS, SKILLS, AND ABILITIES.

Unit      Grade 4    Grade 5    Grade 6

##### Developing Comprehension.

Finds the central thought.	17			
Organizes ideas in proper sequence.	13			
Remembers details of significance.	16			
Summarizes adequately.	19			
Associates reading with previous experiences.	2			
Recognizes "slanted" writing, (bias).				
Draws sensible conclusions.	18			
Outlines using correct classifications.				
Discriminates between facts and opinions.	27			
Evaluates evidence given.				

##### Increases Vocabulary.

Gets word meanings from context.				
Uses glossary and dictionary.	15			
Recognizes prefixes, suffixes, root word.				
Recognizes synonyms, antonyms, homonyms.				
Recognizes little words in compound words.				
Recognizes all vowel and consonant sounds.				
Uses syllabication.				
Selects descriptive and figurative words and phrases.				
Keeps record of new words learned.	4, 15			

##### Adjusting Rate of Reading.

Reads silently at about 200 words per minute (Harris).				
Reads SLOWLY for thorough understanding				
Reads at a MODERATE rate for general purposes.	25, 26			
Reads FAST or SKIMS when noting details.	23			

##### Using Instructional Resources.

Reads a variety of types of material with ease.	7, 12, 20, 21, 23, 27			
Uses index, table of contents, and other parts of book.	1			
Uses factual and fictional materials for full picture.	6			
Consults contemporary sources when available.	8			
Verifies statements in suitable source books.	23			

## BASIC HABITS, SKILLS, AND ABILITIES—Continued.

**Using Instructional Resources—Continued.**

Compares material from two or more sources.	29			
Suggests related activities—drawing, visiting places	3, 5, 9, 22, 24			
Quotes from sources used.				
Makes use of library and librarian's help.	28			
Takes proper care of materials.				

**Communicating through Oral Reading.**

Holds an audience through interesting interpretation.	10, 11			
Phrases suitably.	14			
Participates in choral reading with understanding				

## SUGGESTIONS FOR CORRECTIVE-REMEDIAL INSTRUCTION.

Remedial reading is for those children who are not working up to their mental capacity, and who for some reason have failed to learn to read successfully under one particular system. To help these children the classroom teacher must recognize their probable reading capacity; she must recognize their individual differences in word discrimination, analysis, enrichment, and comprehension.

**Informal Reading Analysis.**

Children's individual reading abilities and disabilities may be determined and analyzed through the use of standardized diagnostic tests or informal classroom testing. The informal testing may be done effectively by the classroom teacher to determine rapidly the individual reading levels. One method for determining individual reading levels is suggested: select two stories from graded readers of various levels, pre-primer to eighth reader, each consisting of fifty words; start with the lowest level and have child read selections of increasing difficulty until he reaches a selection in which he fails more than one word in twenty running words. This indicates his instructional reading level. All material for instructional purposes in reading should be at this level. All reading material for independent reading and recreational reading should be at the level below. Child should be helped with words on which he hesitates five seconds or more. Errors should be corrected at once by the teacher so that child has clear understanding of the content. Questions to check comprehension should be asked following the reading of each selection.

After an analysis of the classroom group has been made, a program for instruction built around the individual needs should be planned. Reading groups should be organized and children with similar disabilities should be placed in the same group. The classroom teacher will then plan the procedure for instruction for each group making sure that materials are at the group's present level of achievement regardless of grade, and that they are of high interest level. The daily reading program should consist of carefully planned lessons aimed toward the development of specific skills that are needed by the individuals within each group.

Careful checks of growth and progress should be made frequently, so that children gain confidence and a feeling of security which is so essential for success in reading.

There is no magic formula which can be used on a remedial reading case to insure success in reading. Basically, corrective methods are no different from the best practices used in good classroom teaching.

## BIBLIOGRAPHY FOR THE BASIC INSTRUCTIONAL READING PROGRAM.

- Adams, Fay, and others. TEACHING CHILDREN TO READ. Ronald Press, 1949.
- Betts, E. A. FOUNDATIONS OF READING INSTRUCTION. American Book Company, 1946.
- Blair, G. B. DIAGNOSTIC AND REMEDIAL TEACHING AT THE SECONDARY LEVEL. Macmillan & Company, 1946.
- Bond, G. L. and Bond, Eva. TEACHING THE CHILD TO READ. Macmillan Company, 1944.
- Broom, M. E. and others. EFFECTIVE READING INSTRUCTION IN THE ELEMENTARY SCHOOL. McGraw-Hill Book Company, 1942.
- Dolch, E. W. PROBLEMS IN READING INSTRUCTION. Garrard Press, 1948.
- Dolch, E. W. REMEDIAL READING MANUAL. Garrard Press, 1945.
- Durrell, Donald D. IMPROVEMENT OF BASIC READING ABILITIES. World Book Company, 1940.
- Gans, Roma. GUIDING CHILDREN'S READING THROUGH EXPERIENCES. Bureau of Publications, Teachers College, Columbia University, 1944.
- Gans, Roma. READING IS FUN. Bureau of Publications, Teachers College, Columbia University, 1949.
- Gray, W. S. ON THEIR OWN IN READING. Scott, Foresman and Company, 1948.
- Gates, A. I. THE IMPROVEMENT OF READING. Macmillan Company, 1948.
- Harris, A. J. HOW TO INCREASE READING ABILITY. Longmans, Green and Company, 1947.
- Harrison, M. L. READING READINESS. Houghton, Mifflin Company, 1939.
- Kirk, Samuel A. TEACHING READING TO SLOW-LEARNING CHILDREN. Houghton, Mifflin Co., 1940.
- Kottmeyer, William. HANDBOOK FOR REMEDIAL READING. Webster Publishing Company, 1947.
- McKee, Paul. TEACHING READING IN THE ELEMENTARY SCHOOL. Houghton, Mifflin Co., 1948.
- Lamoreaux, L. A. and Lee, D. M. LEARNING TO READ THROUGH EXPERIENCE. D. Appleton-Century Company, 1943.
- McCullough, C. M., and others. PROBLEMS IN THE IMPROVEMENT OF READING. McGraw, Hill Company, 1946.
- National Society for the Study of Education.  
 THE TEACHING OF READING, Thirty-Sixth Yearbook, 1937.  
 TEACHING READING IN THE ELEMENTARY SCHOOL, Forty-Eighth Yearbook, 1949.  
 TEACHING READING IN THE SECONDARY SCHOOL, Forty-Seventh Yearbook, 1948.
- Robinson, Helen M. WHY PUPILS FAIL IN READING. University of Chicago Press, 1946.
- Russell, D. H. CHILDREN LEARN TO READ. Ginn & Co., 1949.
- Russell, D. H. and others. READING AIDS THROUGH THE GRADES. Bureau of Publications, Teachers College, Columbia University, 1944.
- Traxler, Arthur E. and Townsend, A. ANOTHER FIVE YEARS OF RESEARCH IN READING. New York Educational Records Bureau, 1946.
- Witty, Paul. READING IN MODERN EDUCATION. D. C. Heath, 1949.
- Witty, Paul and Kopel, D. READING AND THE EDUCATIVE PROCESS. Ginn and Company, 1939.

## INTEGRATIVE READING.

Integrative reading develops the understandings, skills, and attitudes presented in the basic reading program. Such reading is essential for informational purposes in and out of school and for the securing of sound achievement in social studies, science, arithmetic, and other subjects.

The teaching of these content subjects should make use of problem or question assignments built co-operatively by teacher and pupils. It should provide for pupil-contributing activities rather than quizzing devices and make it necessary for the pupil to gain the information he is going to share with the class by evaluating and organizing the ideas he obtains through reading.

The integrative unit focusing on a problem which pupils help to select involves the use of natural learning situations quite remote from the assign-study-recite-test procedures of traditional origin. Reading becomes a vehicle for learning as pupils plan, synthesize, present, and evaluate material related to activities of vital concern to them.

Reading is developed and improved through use in functional situations. This is accomplished through integrative reading when the child uses reading as a tool in social studies, science, and other content subjects by (1) locating information, (2) evaluating information pertinent to his problem, and (3) organizing and presenting pertinent information.

When the activities and units of experience are selected to suit the needs and the interests of the children, reading is utilized to provide the content and vicarious experiences needed in carrying out the unit of work.

Directly following is a part of a plan for an integrative unit carried out in the sixth grade of the Green School, Lowell, by Francis Lambert, a student teacher, under the direction of Miss Elizabeth Coffey, critic teacher. Parts of the plan are omitted since they are similar to those found in the unit "Our Air Age" in the Social Studies; those are retained which most clearly show the use of reading in the unit.

### **Unit Title: How Is Aviation Effecting Changes in Our Life To-Day? An Integrative Unit.**

**Specific Objectives.** (Under Items I and II, only a few of the original objectives are included.)

- I. Understandings and Knowledges.
  - A. The airport is an air terminal consisting of runways, hangars, office buildings, traffic control tower, and weather stations.
  - B. The basic factors that are involved in flight are weather, piloting, and navigating.
  - C. Air mail and air freight and passenger flights have made specific contributions to our modern way of life.
  - D. Aviation has influenced business and industry.
  - E. We live at the bottom of an ocean of air.
  - F. People of other countries have needs similar to ours.
- II. Attitudes and Appreciations.
  - A. Appreciation of the contributions made by the pioneers in aviation.
  - B. Willingness to share information pertinent to aviation.
  - C. Desire for understanding concepts of "Global Geography."
  - D. Creation of a sense of responsibility for good citizenship in a world community.
- III. Skills, Habits, and Attitudes.
  - A. Social.
    1. To develop ability to share information with classmates.
    2. To work co-operatively in a group.



## B. Physical.

1. To improve skills in the use of charts, globes, and maps.
2. To develop skill in making graphs.

## C. Intellectual.

## 1. Language Arts.

- a. To develop ease and correctness in oral and written language.
- b. To increase vocabulary.
- c. To improve skills in reading:
  - (1) Use of preface, table of contents, index, chapter and paragraph headings, glossary, and footnotes.
  - (2) Use of dictionary and encyclopedia.
  - (3) Ability to give reports on material read.
  - (4) Ability to do research.
  - (5) Ability to scan.
  - (6) Ability to outline.
  - (7) Use of syllabication.
- d. To develop desire to spell correctly.

2. Arithmetic, science, music, and art may also be correlated with this unit.

**Problems.** — Compiled from pupil's questions. Many of these questions will be answered as a result of reading.

## I. The Airport.

- A. What is an airport?
- B. Does Lowell need an airport?
- C. Where could they build an airport in Lowell?

## II. History of Aviation.

- A. How was Aviation developed?
- B. Who invented the airplane?
- C. What did Lindbergh do?

## III. Workers in Aviation.

- A. How can I become a pilot?
- B. What does the hostess on an airliner do?
- C. Who repairs the airplane?

## IV. Aircraft.

- A. How does jet propulsion work?
- B. What are the parts of an airplane?
- C. What are gliders?
- D. What is a strato-liner?
- E. What is a blimp?
- F. What are the different kinds of passenger and freight planes in use today?

## V. Air Transportation.

- A. What kinds of goods are shipped by air?
- B. Why do people like to travel by air?
- C. How much does it cost to travel from Boston to New York?

## VI. World Travel.

- A. Does air transportation help us understand peoples of other lands?
- B. How did the "Berlin Airlift" help the German people?
- C. What is the influence of the airplane in world peace?

**Overview.**

As the world moves ahead in the Air Age, there is need for international friendliness based on a greater understanding of our neighbors. Our world has become a neighborhood. To live in friendship with our neighbors, we must know our neighbors. This unit on aviation is one means of aiding children on sixth grade level to understand neighbors near and far.

**Approaches.** (Omitted here, for lack of space.)

**Initial Planning Period.** (Omitted here, for lack of space.)

**Note:** the numbers in the following "Learning Experiences" indicate specific uses of reading; corresponding numbers are found on the chart "Basic Instructional Reading".

Pupil Objectives	Learning Experiences
I. The Airport. What is an airport? Does Lowell need an airport? Where could they build an airport in Lowell? Discuss Lowell's nearness to Boston, products of Lowell not suitable for shipment by air economically, and the commercial airport in Lawrence with daily passenger flights to New York.	1. Read a short story about two children who visit an airport. Present slide film entitled "Seeing the Airport." 2. Read and discuss conditions conducive to location of an airport and compare those conditions with those in Lowell. 3. Select various committees to gather pictures from magazines for "Who's Who?" 4. Make a word list of new vocabulary. 5. Plan a visit to an airport. Record necessary preparations.
II. History of Aviation. How was aviation developed? Who invented the airplane? What did Lindbergh do?	6. Find information on the history of aviation in an encyclopedia. 7. Read and discuss the famous myths and legends of flights. 8. List famous airships, famous planes, and famous people connected with aviation. 9. Write articles for a "Who's Who?" book about flying. 10. Prepare original radio programs where children taking the part of famous fliers can recount their experiences. 11. Prepare quiz programs of the "Information Please" type. Interpret the spirit of aviation through creative dances.
III. Workers in Aviation. How can I become a pilot? What does the hostess of an airliner do? Who repairs the airplanes?	12. Attend a slide film entitled "Air Transportation Jobs and You." Select committees to make reports on "The Pilot", "The Hostess", and "The Mechanic" for book about aviation "Who's Who". 13. Make a line graph of pilots and co-pilots employed from 1932 to 1941. 14. Listen to poetry; e.g., "Poems to an Aviator-Son", by Robert P. Tristram Coffin.

Pupil Objectives (cont.)	Learning Experiences (cont.)
<p>IV. Aircraft.            How does jet propulsion work?            What are the parts of an airplane?            What are gliders?            What is a blimp?            What is a strato-liner?            What are the different kinds of passenger and freight planes in use today?</p>	<p>15. Build a vocabulary list of the principal parts: engine, propeller, wing, fuselage, stabilizer, fin, aileron, and landing gear.</p> <p>16. Read and discuss the ways airplanes differ from balloons and dirigibles.</p> <p>17. Read and discuss kinds of planes and their uses. Read and follow directions for experiments with air. Demonstrate that air is a substance that can exert force and offer resistance to objects moving through it, by making and flying paper gliders, inflating balloons, blowing soap bubbles, flying a kite. Demonstrate that air expands by heating. Discuss air pressure and conduct experiments.</p>
<p>V. Air Transportation.            What kinds of goods are shipped by air?            Why do people like to travel by air?            How much does it cost to travel from Boston to New York?</p>	<p>18. Display pictures of Air Cargo on the bulletin board. Read and discuss with the class the goods that may or may not be shipped by air.</p> <p>19. Read and discuss information on mail service from early times to the present.</p> <p>20. Make out problems in arithmetic from the "Air Express Rates and Time Scale" of the Aviation Education Source book.</p> <p>21. Compute the cost of trips from the United Airlines fare table.</p> <p>22. Write book reports and reviews of stories about aviation.</p> <p>23. Locate various cities on the map and decide on longitude and latitude.</p>
<p>VI. World Travel.            Does air transportation help us to understand peoples of other lands?            How did American Airlift help the German people?            What is the influence of the airplane in world peace?</p>	<p>24. Plan a trip to a foreign country using a Pan American globe or map.</p> <p>25. Read and discuss the culture, customs, and language of the people to be visited.</p> <p>26. Read and discuss the geographical features of the country to be visited.</p> <p>27. Read newspaper articles and display pictures on the Berlin Airlift.</p> <p>28. From the Aviation Education Source book select some air distances based on global air routes and figure out time in hours, minutes, assuming a cruising speed of 200 miles per hour.</p> <p>29. Compare children's articles in "Who's Who" with several references in order to establish authenticity of facts.</p>

<b>Language Outcomes in Knowledges and Skills.</b>	<b>Evaluation Techniques</b>
A. Increase of ability in the use of charts, globes, and maps. B. Increase of ability in the use of index and table of contents. C. Skill in making graphs. D. Increased ease and correctness in oral and written language. E. Increase in vocabulary. F. Improvement of reading skills. G. Desire to spell correctly. H. Accuracy in observation.	1. Objective tests. 2. Essay type tests. 3. Construction of model planes. 4. Maps, charts, graphs. 5. Experiments.

## BIBLIOGRAPHY.

### 1. Books to use for background.

- Merrill, Charles E. TODAY'S GEOGRAPHY OF THE WORLD. Columbus, Ohio: Merrill Co., Inc., 1945.
- Milburn, Marjorie and Beary, John Y. TRANSPORTATION AND COMMUNICATION. Chicago, Illinois: Beckley-Cardy Co., 1939.
- Stanford University School of Education. AVIATION EDUCATION SOURCE BOOK. New York: Hastings House, 1946.
- State Department of Education, Atlanta, Georgia. SKYWAYS TO LEARNING. Atlanta, Georgia: State Dept. of Ed., 1948.

### 2. Books to use with children.

- Cave, Hugh B. WINGS ACROSS THE WORLD. New York: Dodd, Mead & Co., 1946.
- Margulies, Leo. WINGS OVER THE WORLD. New York: Hampton Publishing Co., 1942.

### 3. Books for children to use.

- French, Joseph L. THE BIG AVIATION BOOK FOR BOYS. Springfield, Mass.: McLoughlin Brothers, 1929.
- Iseman, J. W., and Taylor, Sloan. THE BOOK OF AIRPLANES. New York: Oxford University Press, 1929.
- Rinehart, Gladys F. WE SEE THE WORLD. Chicago, Illinois: Beckley-Cardy Co., 1936.

### 4. Slide Films.

- "Seeing the Airport". 33 frames (1944). United Airlines School and College Service, 80 East 42nd St., New York 17.
- "Air Transportation Jobs and You." 55 frames (1946). United Airlines School and College Service, 80 East 42nd St., New York 17.

### 5. Music.

- Dykema, Peter W. et al. MUSIC IN THE AIR. Boston: C. C. Birchard & Co., 1947.

## RECREATIONAL READING.

**Definition.** "In general, reading is done in two types of situations: informational and recreational. There is no clear cut line of demarcation between these two types of situations. For example, much of a boy's time may be spent in the study and the making of model airplanes. In this case reading for information may be worthwhile recreational activity. Generally speaking, however, informational type reading skills are called into play in the reading and study of mathematics, science, and the like, while recreational type reading skills are needed in dealing with various types of literature — fiction, drama, biography, poetry, myth — which are read for enjoyment during leisure hours."

E. A. Betts: FOUNDATIONS OF READING INSTRUCTION

**Purposes.** "The major purpose of recreational reading refers to reading activities for enjoyment and entertainment. The objectives toward which recreational reading is directed are the following:

1. Development of liking for reading as a voluntary leisure time activity.
2. Development of ability to locate interesting and enjoyable reading matter.
3. Satisfaction of present recreational interests and tasks through reading.
4. Development of more varied, more mature, and more refined reading tastes.
5. Development of liking for oral reading as a means of entertaining others."

Albert J. Harris: HOW TO INCREASE READING ABILITY.

Reading instruction which seeks to teach children to read for recreational purposes should utilize a wide variety of non-factual material. The basic purpose of this type of reading is to help children build permanent interests in reading a wide variety of choice material. The attitude of the teacher and pupils should be a recreatory attitude, and the methods and instructional material must be those which are most likely to develop the desired interest and taste,

### **Materials.**

Recreatory materials should include not only children's classics but also travel, history, fiction, myth, legend, science, biography, poetry, short stories, and drama. Selections of high quality should be included, particularly those which have strong interest appeal for pupils and which pupils can read with comparative ease. These selections should be chosen to cover a wide range of reading difficulty providing material which can be read by children at all levels in reading. The teacher of children in the intermediate grade-age group should provide books ranging from early primary to secondary-school level of difficulty.

Criteria for choosing selections, as given below, include suggestions from two sources —

THE HORN BOOK, and McKee's THE TEACHING OF READING.

1. Each selection must possess literary merit and content that is worth reading.
2. Each selection must appeal to the child's immediate interests.
3. Each selection must be interesting in its own right.
4. The selections must be used to cover a wide range in type and mood, peoples and countries, as well as in reading difficulty.
5. Books must be kept up to date. The best of new and suitable books should be made available as publications come from the press.

### **Activities.**

The following types of activities may be followed in recreational reading:

1. Oral reading by the teacher.
2. Oral reading by individual pupils.
3. Discussion of favorite stories.

4. Free silent reading (Children browse through books and magazines finding material to be read in the school room.)
5. Book reports.
6. Dramatization.
7. Choral reading (poetry and lyric prose.)
8. Programs for "Book Week"
  - a. Assemblies.
  - b. Games involving titles and authors — charades, riddles, etc.
  - c. Pantomimes of situations in stories.
  - d. Writing of play from story.
  - e. Making of illustrations, posters, cartoons, etc.
9. Organizing reading corner for classroom or library for building.
10. Exhibits for "Book Week".
11. Visits to Children's Room at Public Library; earning library certificates.
12. Using audio-visual aids in building love of literature — records, movies, radio, television.
13. Recording extent of free reading.
14. Displaying book jackets and advertisements of recent books.
15. Participating in book club.
16. Selecting books from the bookmobile.
17. Using reading in developing hobbies.
18. Making reading scrapbooks.

**Goal: Lasting Interest in Literature.**

Guidance in recreational reading must be so vital that the child turns increasingly to good books for enjoyment and for information. He must feel at home with books. He should know where to find what he wants in a library; he should know the librarian as his friend. He must be helped to outgrow ugly comics and poorly written books by surrounding him constantly with literature of high quality which has meaning for him.

David H. Russell says:

"A teacher can plan and work for the development of reading interests and tastes as definitely as she can give a place to the more mechanical reading skills and abilities. The creation of a strong love for reading and permanent interests in reading are the crowning achievement of a modern reading program."

CHILDREN LEARN TO READ, p. 277

**BIBLIOGRAPHY.**

**The following books contain excellent lists of books for children.**

Arbuthnot, M. CHILDREN AND BOOKS. Chicago: Scott, Foresman and Company, 1947.

A textbook on children's literature with some selections, reproductions, bibliographies, and study suggestions.

Betzner, J., and Moore, A. EVERY CHILD AND BOOKS. New York: Bobbs, Merrill Co., 1940.

For parents and teachers, a guide to children's reading and an aid for the development of discrimination toward a better enjoyment of books.

CHILDREN'S CATALOG. New York: H. W. Wilson Company.

The most recent edition is the 7th with supplements to date. The best current source of books that are evaluated by librarians who are specialists in their fields.

- Depew, O. CHILDREN'S LITERATURE BY GRADES AND TYPES. Boston: Ginn and Co., 1938.  
 Contains a brief history of children's literature with selections for first to eighth grades from outstanding works plus lists of literature for each grade and exercises for students and teachers. There is a danger that material catalogued this way may be used only within these limits.
- Duff, A. BEQUEST OF WINGS. New York: Viking, 1944.  
 Mrs. Duff, a former librarian, describes from her own experience the rich enjoyment found in sharing books. Many good ideas, and many top quality books discussed. For teachers and parents.
- Eaton, A. READING WITH CHILDREN. New York: Viking, 1940.  
 The author's genuine feeling for children's books gives inspiration and direction. There are chapters on Poetry, Stories Old and New, Betwixt and Between, Artists at Work for Children, Nonsense, and many others.
- Eaton, Anne Thaxter. TREASURE FOR THE TAKING. New York: Viking, 1946.  
 An outstanding librarian has prepared this guide for parents and others who are selecting books for children. Annotated lists under broad subject headings such as BOYS AND GIRLS OF OTHER LANDS, THE WONDERS OF DAILY LIFE, STORIES OF ADVENTURE, SEVEN STORIES HIGH, etc.
- Hazard, P. BOOKS, CHILDREN, AND MEN. Boston: Horn Book, Inc., 1944.  
 A most distinguished contribution to the field of children's literature. A discriminating survey of children's books through the centuries.
- HORN BOOK MAGAZINE. New York: Horn Book, Inc. Published six times a year. \$3.00.  
 This is planned as a magazine about books and reading for children and young people and directs its materials to teachers, librarians, parents, and all people who deal with book selection. To the elementary school librarian and the children's librarian of the public library, this is a publication of vital import.
- Mahoney, B., and Whitney, E. REALMS OF GOLD IN CHILDREN'S BOOKS. New York: Doubleday, 1929.  
 A fine collection of annotations and anecdotes about some of the best books, authors, and illustrators for children. Should be supplemented with recent publications to bring it up to date.
- Rue, Eloise. SUBJECT INDEX TO BOOKS FOR PRIMARY GRADES, 1943. First Supplement 1946.  
 With special attention given to the subject areas included in the elementary curriculum through the third grade, these two books are valuable indexes to the subject material found in commonly used readers.
- Rue, Eloise. SUBJECT INDEX TO BOOKS FOR INTERMEDIATE GRADES. 1950 edition replaces 1940 index and 1943 Supplement except for older material.  
 Tries to index as many of the books as possible that are being used in present day teaching-methods throughout the country. Useful for locating specific material at specific grade levels and in planning units of study.
- Tabá, Hilda. READING LADDERS FOR HUMAN RELATIONS. Educational Policies Commission.  
 A very fine list for teachers and parents of books selected by outstanding educators and librarians. The choice of titles is based on themes and ideas dealing with human relations to "1) create sensitivity to the experiences of other individuals, 2) to develop expectation of differences among people, 3) to extend insight into the different value patterns".

**Magazines.**

**AMERICAN GIRL.** Published monthly by Girl Scouts, Inc. \$2.00

This magazine covers a wide variety of wholesome recreational and informational material for girls in the 5th-9th grades. The illustrations and material have kept pace with the times; there are recipes, grooming hints, fashions, book reviews, and many fine stories which often appear later in book form.

**BOYS' LIFE.** Published monthly by the Boy Scouts of America. \$2.50

Many Scout activities, sport stories, serials, articles, and fun. This publication has recently assumed a new policy of better stories, more up-to-date articles, more crafts and hobbies, the most outstanding boys' writers, etc.

**CURRENT EVENTS.** Published in 36 issues by American Education Press. \$.75

A news magazine covering economics, science, and politics for classroom use through 10th grade.

**EVERY WEEK.** Published in 36 issues for 75 cents.

A recent news issue similar to CURRENT EVENTS.

**JACK AND JILL.** Published monthly by Curtis Publishing Company. \$2.50

A varied, all-purpose magazine for the 1st-5th grades with stories, a serial, comics, cut-outs, songs, games, puzzles, pictures, as well as material for parents at the end.

**JUNIOR NATURAL HISTORY MAGAZINE.** Published monthly by the American Museum of Natural History. \$1.50

A supplementary publication of the Natural History Magazine with excellent material for elementary and junior high students in the fields of astronomy, ornithology, plant, animal, and marine life. Good photographs, seasonal articles, and special departments.

**AMERICAN JUNIOR RED CROSS.** Published monthly October through May by the American National Red Cross. Free to members, otherwise 50 cents.

For early elementary grades, this publication has stories and book reviews, some poetry, and articles on the activities of the Junior Red Cross in this country and abroad.

**MY WEEKLY READER.** Published weekly with special summer issues.

A newsheet that can provide the good habit of reading the news of the minute and that can help make the transition to regular newspapers an easy one for grades 1-6.

**OPEN ROAD TO BOYS.** Published monthly by the Holyoke Publishing Company. \$2.00

Recent issues show steady improvement in quality of material, with more of the genuine sport, hobby, adventure, and travel story for the 5th-8th grades.

**OUR DUMB ANIMALS.** Published monthly by the M.S.P.C.A. \$1.50

For the 3rd to 6th grades, there are humane articles and stories with many appealing photographs.

**PLAYS.** Published monthly by Plays, Inc. \$3.00

A drama magazine for young people meets a constant need for non-royalty plays and radio scripts. This privilege extended to subscribers only, however. A typical issue contains about a dozen plays grouped according to grade level — primary, intermediate, junior high, and high school. Includes production notes and lists of plays appropriate for the month.

**POPULAR MECHANICS.** Published monthly by the Popular Mechanics Company. \$3.50

Of wide interest to boys of mechanical inclination, with articles on science, mechanics, inventions, and crafts. 5th grade up

**STORY PARADE.** Published monthly except July and August by Story Parade, Inc. \$3.00

STORY PARADE is rated highest for its literary content. A definite attempt has been made



to bring its format to the level of its content so that now it is a colorful, wellprinted periodical with stories, illustrations, book reviews, poems, nature article by Wilfred Bronson, children's contribution, etc., of merit. Grades 3-6.

YOUNG AMERICA. Issued weekly. 60 cents.

For 6th grade up, with news, jokes, quizzes, contests, and activities.

YOUNG WINGS. Published monthly by the Junior Literary Guild. 50 cents to non-members of the Guild.

Book reviews, informal biographies of the authors, letters and comments from the readers all designed to keep children abreast of the current trends in Junior Literary Guild book selections.

#### QUESTIONS ASKED BY TEACHERS CONCERNING READING INSTRUCTION.

**1. What is reading readiness?** Readiness for reading should be developed at all levels. It implies orientation, preparation, approach, introduction and reading motive, readiness for understanding, background discussion, preliminary development, stimulating interest, approach or point of contact, and quickening comprehension. It also implies that a child's reading level has been determined and that selections to be read are at that level. (See section on Basic Reading Instruction).

**2. How can a classroom teacher diagnose reading difficulties?** Reading abilities and disabilities may be determined through the use of informal and standardized tests, and auditory and visual tests. There are several types of standardized tests. There are survey or general achievement tests which measure achievement in all subjects; there are diagnostic tests that may be given to an individual or group to help in the analysis of learning difficulties; there are reading capacity and achievement tests that help to determine how well a child understands what he hears and reveals discrepancies between understanding spoken language and understanding printed words.

**3. What is continuous progress in reading?** This implies that children proceed at their own rate from one level of difficulty to the next regardless of grade placement. (See Reading Progress Profile).

**4. How may children be grouped for instruction so that all children are reading at the same time?** By using pupil-leaders chosen from their own groups much time may be saved. The teacher plans the lessons, trains the leaders, and spends the reading time checking on various groups or instructing one group herself.

**5. What is the place of workbooks and worksheets in the reading program?** Workbooks that accompany basic reading texts may be used effectively if they are used during the regular reading period to further develop specific skills. Worksheets that are made out by the teachers are highly effective in providing practice and drill on needed skills because they may be made to fit the individual needs of all groups.

**6. Where may supplementary reading materials be obtained?** Local libraries and the Division of Public Libraries, State Department of Education, will loan books for one month at a time upon request. Classroom teachers should plan to build up classroom libraries consisting of books on all reading levels, and on a variety of subjects. In most systems a basic reading series is used in all classrooms. In addition to this, there should be available in every room a minimum supply of all reading materials on all levels of a basic reading series other than those used in preceding grades. With the number of good series on the market it is quite possible to use a different one in each grade for this purpose.

**CHAPTER XIII****MUSIC EDUCATION**

	<b>Page</b>
<b>Introduction</b> . . . . .	246
<b>Overview</b> . . . . .	247
Chart for Intermediate Grades	
General Outline for Developing Music Material in Relation to Any Unit.	
<b>Material by Grades</b> . . . . .	249
Units for Grade 4.	
Units for Grade 5.	
Units for Grade 6.	
<b>References for Teachers</b> . . . . .	257

**INTRODUCTION.****Ultimate Aim.**

The ultimate aim is to cause children to know, to love, and to understand music in as many forms as possible and thus to bring added joy into their lives and added culture and refinement.

**OBJECTIVES.**

The objectives of music education are

1. To promote maximum individual growth and development through music activities resulting in desirable attitudes, interests, understandings, and skills.
2. To provide joyful experiences with beauty.
3. To encourage satisfying participation in an esthetic group achievement which would not be within the power of the individual.
4. To contribute to the enrichment of a program planned to attain fusion.

**VALUES.**

Music is a record of the joys, sorrows, and ideals of man. It assists the child in understanding and appreciating his own culture, other contemporary cultures, and past cultures.

Personal relationships which a child experiences at school educate him just as genuinely as what he sees, hears, reads, or otherwise experiences. Music is a social and democratic art and it aids social development and adjustment.

A well-organized music education program is a sequence of esthetic experiences which may provide enjoyment, recreation, and personality development.

## OVERVIEW CHART FOR INTERMEDIATE GRADES.

### AREAS OF MUSICAL EXPERIENCES.

PERFORMING	LISTENING	CREATING	MUSIC READING
<p><b>Singing.</b></p> <p>Provide for growth of exceptional children.</p> <p>Strive for good tone quality and artistic interpretation.</p> <p>Extend rote-song repertory.</p> <p>Build song repertory by independent reading.</p>	<p><b>Ear Training.</b></p> <p>Extend aural sensitivity to</p> <ol style="list-style-type: none"> <li>(1) melodic and rhythmic patterns.</li> <li>(2) phrase structure, repetition and contrast.</li> <li>(3) tonal combinations.</li> <li>(4) dynamics, meter, speed, and mood.</li> </ol>	<p>Create song interpretation.</p> <p>Create songs, poems, dances, harmonic combinations.</p> <p>Record the creative product by use of notational symbols.</p>	<p>Provide for growth in skills and understandings by use of music notation.</p> <p>Associate aural impression of new tonal, rhythmic patterns with visual symbols.</p> <p>Build and use vocabulary of harmonic, melodic, and rhythmic patterns.</p> <p>Encourage development of ability to interpret the relatively complex symbols notation into musical experiences.</p>
<p><b>Responding.</b></p> <p>Increase rhythmic understanding by bodily responses to melodic contour, rhythmic accent, rhythmic patterns, and by participation in dramatization, pantomime, singing games, folk and social dances.</p>	<p>Recognize by sound and sight also instruments of band and orchestra.</p> <p>Build listening repertory.</p> <p>Use systematically audio and visual teaching aids.</p>		
<p><b>Playing.</b></p> <p>Work with orchestral and band instruments and ensembles.</p>			

#### Note:

Growth in musical power and understanding is cumulative. The Overview Chart lists those experiences common to the intermediate grades.

In addition the teacher should be responsible for the new experiences that are introduced at each level. These follow.

**Grade 4.** Use orchestral instruments, in addition to the preorchestral instruments used in the primary grades. Develop consciousness of part singing by use of rounds, descants, and harmonic cadences. Recognize by sound and sight the commonly used instruments of band and orchestra. Develop sensitivity to elementary form. Sing two-part songs.

**Grade 5.** Recognize by sound and sight the less common instruments of band and orchestra. Listen for harmonic combinations.

**Grade 6.** Sing three part songs. Work for conscious artistic interpretation.

At each grade level music will correlate with many other subjects and activities. Social studies, the nature phases of science, and physical education not only offer such opportunities, they often actually need musical illustration and interpretation at many points. Music thus becomes a medium of expression in many situations.

#### AREAS OF EXPERIENCE.

Active participation in vital sequential musical experiences based on child interests, increasing in scope and complexity, and leading towards organized mastery, is the main objective of music education. Acquisition of skill and development of basic mental functions are necessary for the fulfillment of pupil needs and interests.

**Singing.** The joyful experience of correct use of the voice in the class, group, or individual singing of beautiful songs is a most satisfying medium of self-expression. The building of a repertory of short, interesting, and musically significant songs appropriate to the expanding powers of the child promotes growth and development in pleasure, skills, and understanding.

**Listening.** An aural awareness of the beauty and meaning of music and sensitivity to its emotional and esthetic appeal is a basic need in all musical experiences. Active listening, day by day, in a variety of experiences, develops perception of mood, melody, pulse, rhythm, harmony, form, and tone-color. Musicianship is developed by intelligent listening to vocal and instrumental music in the school, in the church, in the home by directed program, at concerts, and in the theatres.

**Responding Rhythmically.** Pleasure is derived from synchronization of rhythm and bodily movement. Muscular response to fundamental movements, to note and rest values, to accent, measure, rhythmic patterns, phrases, and mood, develops rhythmic grasp and contributes to mental and musical growth in all areas. Rhythm is a motor experience. Rhythm band activity gives pleasure and it leads to more advanced activities.

**Playing.** Opportunity for self-expression by playing an instrument gives pleasure and satisfaction, and contributes to the development of sensitivity to beauty, of social and emotional control, of motor skill, of music reading, of talent, and of technique required in school orchestras and bands.

**Environment.** Pictures that illustrate musical instruments, composers, moods, definite correlations of music with art, with literature, creative illustrations, exhibits of instruments, and charts of themes stimulate interest. The teacher should acquire the ability to enjoy music aesthetically. Sensitizing the human mind and soul is the most important task of educators.

#### GENERAL OUTLINE FOR DEVELOPING MUSIC MATERIAL IN RELATION TO ANY UNIT.

- Singing:** Songs of art value.  
Songs of correlative value.
- Playing:** In the rhythm band.  
In the toy orchestra.

In the school orchestra.  
In solo or small ensemble.

**Listening:** To art songs.

To instrumental music.

**Responding:** With free bodily movement to interpretative rhythms.

To fundamental rhythms, folk dancing, and singing games.

**Creating:** Creative interpretation in singing, playing, listening, and responding.

Creative expression of that which is new by songs and chants, rhythms and dances, dramatizations, action songs and pantomines, sound effects, and instrument construction.

**Reading:** References for music background for teachers and for children.

**Creating.** Creative activity is the recombining of images and tonal ideas into forms that, for the child who makes them, seem new. All musical experiences may be creative either in the interpretative sense or through original expression. It is the means of self-realization, based upon feeling. Experiences must be coupled with growing mastery of means and material, thereby resulting in growth in educative value. A creative attitude can be developed.

**Music Reading.** Application of the basic mental functions of (1) symbolic interpretation, (2) observation and description, (3) memory, (4) association, and (5) reasoning is involved in the ability to sing in correct tune and time from symbols of notation.

## MATERIAL BY GRADES.

### GRADE 4. OVERVIEW OF MATERIAL.

**Performing:** correct tone production; rote song repertory; note song repertory; consciousness of part-singing; physical response to melodic contour, rhythmic accent, rhythmic patterns; dramatization; pantomime; singing-games; folk and social dances; instrumental experiences; provision for growth of exceptional children.

**Ear Training:** aural awareness to melodic and rhythmic patterns; phrase structure, repetition, and contrast; tonal combinations, dynamics, meter, mood; sensitivity to elementary form, instrumental timbre; listening repertory.

**Creative:** song interpretation, free rhythmic expression, instrumentation, original melodies, poems, recording creative products by use of notational symbols.

**Music Reading:** association of aural impression with visual symbols; vocabulary of tonal and rhythmic patterns; growth in skills and understandings by use of music notation.

### GRADE 4.

#### UNIT: LISTENING RELATED TO THE CHILD'S SINGING EXPERIENCE.

(Materials) NEW MUSIC HORIZONS. FOURTH BOOK. New York: Silver Burdett Company, 1945.

NEW MUSIC HORIZONS. Teachers' Manual for Intermediate Grades. New York: Silver Burdett Company, 1948

#### General Aims.

To lead the children to realize that the moods expressed in music are to be found in the songs they sing as well as in the music to which they listen

To induce more beautiful singing through a deliberate plan and effort to "make our singing express the beauty of the songs."

To develop the voices of the children through beautiful singing.

To contribute to the cumulative growth in appreciation of music, in general, through singing.

### **Specific Aims.**

To contrast the mood and spirit of the songs, "O Morning Star", Bach, p. 84, and "The Swing", Nevin, p. 126.

To sing each song well enough to convey its beauty and meaning to those who hear us sing.

(These two songs should have been well learned during the singing lessons prior to this lesson.)

#### Lesson I. "O Morning Star", Bach, p. 84, Fourth Book.

Children sing the song as beautifully as they can. "Did you bring out the meaning of the text?" "Were your voices good enough to show how lovely you think the song is?" "Did you sing in the mood of the song?"

Children discuss their ideas of the song. They find that the mood is serious and full of spiritual feeling, of devotion and praise; that the text is noble and deep in meaning. They may think of the "star" as "The Star of Christmas".

"When we repeat the first two lines should we sing in exactly the same manner, or should we try to show the difference in the meaning of the words?" (Teachers show children that repetition is for some kind of emphasis. Sometimes more tone is needed and sometimes less, depending upon the meaning. Fourth grade children will readily grasp this idea.)

Children sing the first two lines and try to make a slight contrast between them in the repetition.

Teacher and children discuss the third and fourth lines. "How should we sing the word 'Holy'?" Children think it should be sung with a sustained tone, and never without meaning. "In the last line, the descending stepwise melody and the long ending seem to give weight and importance to the text."

Children sing the third and fourth lines as suggested. Children sing the entire song, trying to put into their singing the serious mood, the reverent feeling, and the rather mystical idea of "The Christmas Star." (Their imagination will rise to the appeal.)

#### Lesson II. "The Swing". Nevin, p. 126. Fourth Book.

Teacher and children discuss the text and meaning of this song.

Children sing it, striving to show in their voices the happy mood, the charming text-meaning, and the swinging rhythm.

Discuss the reasons for the beauty of this song. "Why do you like so much to sing it?"

Children think about and talk of their feeling about the song. They probably will like "the way it swings", the melody with its changes and repetitions, and the unexpected change in the last three phrases, ending the song. They may suggest how to improve their own singing.

Children sing the song again, trying to use their tone-color, observing phrases and the rhythmic swing. Someone will be sure to suggest that the picture expresses the spirit and story of the song.

#### Lesson III. "O Morning Star" and "The Swing".

Children sing "O Morning Star" and bring into their singing all they can of the reverent mood. "The dignified melody and steady rhythm express this mood."

Children sing "The Swing", showing the charming swinging motion and beautiful mood (expressed in rhythm, melody, and words).

Children compare the two songs. Differences: "O Morning Star" is dignified and reverent, filled with faith in God's love. It is even mystical in thought and spirit. The mood of the song is created by the even, smooth, flowing rhythm, the stately and dignified melody and the fine text. "We can make our own mental pictures of this song." "The Swing" is gay, swinging, and filled with the spirit of happy play. It is about something we all love. The mood is created by the uneven rhythms and swinging motion, by the melody so full of gaiety, with its skips and changes, and by the delightful Stevenson poem. Similarities: Both are great songs because the longer we know them the better we like them; both have beautiful texts, melodies, and rhythms suited to the spirit of each song; each song is about real life experiences, worship, and play.

**Conclusions.** (Concerning development of appreciation and interpretation.)

Songs should be sung so as to bring out their beauty and express the particular meaning of the content; they should be sung with our best tone quality, with good phrasing and appropriate rhythm; and the singers should feel the mood they wish to express. Learning to sing well will greatly help us to understand good performance and to hear the best in the music to which we listen.

After songs have been learned and enjoyed, the teacher should give a lesson in which the composers are the central thought, relating songs to instrumental music of the listening lessons.

This unit was taken from the source book, by permission of the publishers.

## GRADE 4.

### UNIT: TUNES AND TONES.

(Materials.) LET'S EXPLORE MUSIC. Boston: Ginn and Company, 1940.  
AUDIO-VISUAL TEACHING AIDS.

#### A. Listening. (All numbers refer to Victor Records.)

##### 1. String Instruments.

- |                |  |
|----------------|--|
| a. Violin      | From the Land of the Sky-Blue Water, Cadman: 1115<br>Aloha Oe, Queen Liliuokalani: 1115<br>Menuet, Bach-Winternitz: 1136<br>Gavotte, Beethoven-Kramer: 1136<br>Sea Murmurs, Castelnuovo-Tedesco-Heifetz: 1645<br>The Flight of the Bumble-Bee, Rimsky-Korsakov: 1645 |
| b. Viola       | Menuet, Paderewski: 20164  |
| c. Cello       | The Swan, Saint-Saens: 7201<br>Cradle Song, Schubert: 20079  |
| d. Harpsichord | Minuet, Mozart: 1199<br>Le Tambourin, Rameau: 1199<br>Le CouCou, Daquin: 1199  |

##### 2. Wood-wind Instruments,

- |             |   |
|-------------|---|
| a. Piccolo  | Badinage, Herbert: 20164  |
| b. Flute    | Wind Amongst the Trees, Briccialdi: 20344<br>The Whirlwind, Krantz: 20525<br>Elfin Dance, Grieg: 20079<br>Omaha Indian Game Song, 20164 |
| c. Clarinet | Waltz, Brahms: 20079  |

- d. Oboe                   Serenade, D'Ambrosio: 20161  
Andantino, Thomas: 20079
- e. Bassoon                Scherzo, Beethoven: 20164  
Hungarian Fantasie, Von Weber: 20525
- 3. Brass Instrument.
  - a. Cornet                Minuet, Beethoven: 20164
- 4. Percussion Instruments.
  - a. Piano                To a Wild Rose, MacDowell: 22161  
To a Water Lily, MacDowell: 22161  
Golliwogg's Cakewalk, Debussy: 7148  
The Marionette Show, Goossens: 24525
  - b. Celesta               Evening Bells, Kullak: 20079  
The Waltzing Doll, Poldini: 20161
  - c. Bells                 Minuet, Gluck: 20440  
Minuet, Mozart: 20440
  - d. Xylophone            Gavotte, Mozart: 20440  
Gavotte, Gretry: 20440
- 5. Additional Material.  
Instruments of the Orchestra by Sight, Sound and Story, R.C.A. Manufacturing Company.  
Instruments of the Orchestra: 20522 and 20523

## **B. Performance**

- 1. Singing.
  - a. Since this unit is emphasizing tone qualities, the class may be reminded of the three ways each individual voice can make sounds: (1) singing the words in the song, (2) using a neutral syllable "loo," and (3) humming
  - b. The difference between men's and women's voices may be mentioned if it comes up naturally.
- 2. Playing.  
This unit gives an excellent opportunity to present to the class those children from the entire school who play instruments.

## **C. Creative Activities.**

- 1. Plan concerts, piano or violin recitals, or recitals on any other combination of instruments desired by the class. The class plans its own program and conducts it.
- 2. The best original melodies composed through the year should be included in the program.
- 3. Make attractive program covers, using as decorative ideas either pictures or patterns in color.
- 4. Discuss concert behavior of
  - a. performers    b. listeners    c. ushers    d. guests
- 5. Present such a program, student planned and performed.

## **D. Informational Aspects.**

- 1. Many instruments by sight and sound.
- 2. The names of some great interpretative artists.
- 3. What constitutes an orchestra.
- 4. Increased power in recognizing "picture" and "pattern" music.
- 5. The beginning of a listening repertoire.



### Teaching Suggestions.

It seems unnecessary to plan any lessons upon this unit. Only one suggestion seems important. The pictures of the instruments, or the real instruments, should always be available. The orchestra charts and the accompanying records are an invaluable equipment. The teacher's ingenuity will invent interesting ways in which they may be used.

The value of concerts planned and conducted entirely by the children cannot be overestimated. In this way, familiarity with correct titles and the names of composers is brought about in a most natural way.

The opportunity to hear the older children play solos is highly significant. The desire to take up the study of some instrument at this time is most natural and guidance in the choice is important.

This unit was taken from the source book, by permission of the publisher.

## GRADE 5.

### OVERVIEW OF MATERIAL.

**Performing:** good tone production and artistic interpretation; rote-song repertory; note-song repertory by independent music reading; part-song repertory: stepping patterns, clapping patterns, dramatization; pantomime, dance rhythms; instrumental experiences, band, orchestra, small ensembles.

**Ear Training:** development of aural sensitivity to melodic and rhythmic patterns, phrase structure, repetition, contrast, form, harmony, dynamics, meter, speed, instrumental timbre; cumulative listening repertory

**Creative:** song interpretation, songs, dances, poems, harmonic combinations; recording of product.

**Music Reading:** association of aural impression with new tonal, rhythmic patterns; with visual symbols; vocabulary of harmonic, melodic, and rhythmic patterns; growth in independent music-reading power; growth in understandings by use of music notation.

## GRADE 5.

### UNIT: SHALL WE MAKE A MUSIC PLAY?

(Materials.) OUR LAND OF SONG. Book Five of A SINGING SCHOOL Series. Boston: C. C. Birchard, 1942.

OUR LAND OF SONG. Teachers' Manual. Boston: C. C. Birchard, 1944.

Suggested Title: HERE AND THERE IN EARLY AMERICA.

Suggested Scenario.

Scene: A schoolroom of early America. Chairs grouped at front of room or on platform, informally, for the rehearsal which makes the play. No scenery except a wall-map of the United States.

Actors: The children and the teacher. (The teacher may be an older child or the children's own teacher.)

Situation: A group of children in an early American school are preparing for their Friday afternoon "program". They have learned a number of songs, and are trying to find some plan which will weave them together.

The wall-map of the United States gives them the idea of grouping their songs to correspond with the four main regions of the country. A title for the musical play is chosen. The boys

want vigorous songs, while the girls insist on the inclusion of some dances. After the grouping of the numbers has been worked out, the rehearsal really begins.

The speech of welcome is given and a brief introduction for each number is improvised. This should actually be done by the children. A bit of humor may well be added, now and again, and planning it will make for keener enjoyment of the humor in the songs. Writing these brief speeches will correlate splendidly with work in English, spelling, and geography, and make of the music play a unified and valuable project.

Here are some songs which may be used in the music play. From the suggested list enough songs may be chosen to make a varied and interesting program.

#### Songs from the North.

- Whistle, Daughter. (page 8) Duet.
- Paul Bunyan. (110) Solo and chorus.
- The Erie Canal. (114) Boys' chorus (or entire group).
- Pig in the Parlor. (146) Dance.

#### Songs from the South.

- The Glendy Burk. (119) Chorus.
- Climbing Up Zion's Hill, (120) Solo and chorus.
- I Had Four Brothers. (118) Chorus.
- All The Pretty Little Horses. (122) Chorus.
- When Your Potato's Done. (127) Chorus.
- Where, O Where Is Old Elijah? (20) Boys' chorus.
- Wait, Ole Mule. (124) Boys' chorus and solo.
- John Henry. (112) Boys' chorus in groups.
- Go 'Way, Old Man. (25) Chorus.
- Barkalingo, Wahtermillion. (113) Chorus.
- Sweetheart Out A-Hunting. (126) "Play-party" folk game.
- Four in a Boat. (128) Dance.
- Turn, Cinnamon, Turn. (134) Dance.

#### Song from the East.

- Reuben and Rachel. (57) Two groups, two children, or both.
- Cobbler and the Crow. (58) Solo and chorus.
- 'Way, 'Way Off on George's Bank. (109) Solo and chorus.
- The Rattle Sna-Wa-Wake. (122) Solo and chorus.
- The Little Pig. (123) Chorus.
- Rustic Reel. (142) Dance.

#### Songs from the West.

- Rio Grande. (63) Boys, solo and chorus.
- The Lone Star Trail. (116) Boys, solo and chorus.
- Sacramento. (108) Boys, solo and chorus.
- Shenandoah. (115) Boys' chorus.
- The Navajo Blanket. (112) Chorus.
- At the Gate of Heaven. (120) Duet or chorus.
- Oh, California. (130) Dance.
- Brown-Eyed Mary. (138)

Costumes. Costumes like those in the illustration on page 138 of **OUR LAND OF SONG** will be simple and appropriate.

This unit was taken from the source book, by permission of the publisher.

## FURTHER SUGGESTIONS.

This unit, as outlined, contains experience in one area only,—singing.

The selection and development of activities in the other areas of musical experience (playing, responding physically, listening, and creating) and in correlated activities would provide opportunity for more complete creative realization by pupils, or by pupils and teacher.

The Music Office of the Massachusetts Department of Education will be glad to receive and to circulate copies of completed units as created by pupils, or by teacher and pupils.

## GRADE 5.

### UNIT: THE WORLD OF BEAUTY.

(Materials.) NEW MUSIC HORIZONS. FIFTH BOOK. New York: Silver Burdett, 1946.  
NEW MUSIC HORIZONS. Teachers' Manual for Intermediate Grades. New York: Silver Burdett, 1948.

#### Earth and Sky.

Autumn Leaves. (pg. 14)  
Evening Song. (89)  
Haying Time. (154)  
Jack Frost. (49)  
Onward the Brook. (47)  
Sled Race. (70)  
Song of the Seasons. (136)  
The Meeting of the Waters. (166)

#### Nature.

Birds and Flowers. (156)  
Flowers Bright I Bring You. (14)  
Flowers in My Garden There. (118)  
Flowers That Blow. (77)  
Orchard Song. (117)  
The Happy Sheep. (198)  
The South Wind and the Rose. (172)  
The Whale Song. (8)

This unit was taken from the source book, by permission of the publisher.

## GRADE 6.

### OVERVIEW OF MATERIAL.

**Performing:** good tone and artistic interpretation; rote-song repertory; note-song repertory; independent reading of unison and part songs; growth of exceptional children; stepping, clapping, dramatization, pantomime, dance rhythms; instrumental activities.

**Ear Training:** experiences in aural sensitivity to phrase patterns; form; dynamics, meter, speed, mood, instrumental timbre; audio-visual aids.

**Creating:** song interpretation; songs, poems, dances, harmonic combinations; recording of creative product by use of notational symbols.

**Music Reading:** development of ability to interpret the relatively complex symbols of notation into joyful musical experiences

## GRADE 6. (SPECIFIC CORRELATION WITH SOCIAL STUDIES UNITS.)

### UNITS: OUR NEIGHBORS. OTHER AMERICAS.

(Materials.) THE AMERICAN SINGER. BOOK SIX.  
American Book Company, Boston 16, Mass. 1947.  
GUIDE TO THE AMERICAN SINGER. BOOK SIX.  
American Book Company, Boston 16, Mass. 1947.  
AUDIO-VISUAL AIDS. (Records and Films.)

## OUR NEIGHBORS.

**Canada.**

Canadians who live in the eastern provinces sing a great deal of music of French origin. Most of these songs are sung in French. People in the more westerly provinces sing and dance music which came largely from the British Isles. It might be effective to hear and sing music of French origin in association with that which is British. Such treatment might well lead to interesting study of the history of Canada and her people.

## French-Canadian Songs.

Marianne Goes to the Mill, 76.

In My Bark Canoe, 79.

The Lass Canadian, 80.

(Additional songs in Book Five. The American Singer.)

## French-Canadian Record.

Decca: French Folk Songs for Children (sung in French) 2 albums.

## Songs of the British Isles.

John Peel, 83.

Loch Lomond, 84.

The Keel Row, 86.

Wraggle Taggle Gypsies, 88.

Bonnie Doon, 172.

Killarney, 177.

March in Three Beats, 178.

Golden Slumbers, 180.

Smiling Spring. 184.

## Records for the British Isles.

Decca: Old English Airs (string quartet).

Victor: Welsh Traditional Songs (harp accompaniment).

Decca: Irish Ballads (album).

Victor: English Folk Songs and Ballads.

Victor: Irish Dances (album).

Victor: Irish Songs (album).

**Mexico.**

## Songs.

Lullaby, 113.

Pilgrim's Song, 115.

(Additional songs are in Book Five.)

## Records.

Columbia: South of the Border (Gould)

Decca: Rolito (album) (song and story).

Columbia: A Program of Mexican Music (album).

Imperial: Mexican Folk Dances (album).

(Imperial Record Company, 137 Northwestern Avenue, Los Angeles, Cal.

Pan: Mexican Popular and Dance Music.

(Pan American Record Company, 619 Antonio Avenue, Los Angeles, Cal.

**Sound Films.**

- British: People of Mexico (music and folk dances).  
 (British Information Service, 30 Rockefeller Plaza, New York 20, N. Y.)  
 University Depositories: Rural Life in Mexico.

**Other Americas.**

THE AMERICAN SINGER SERIES is rich in music of the other Americas. Many of the songs in the earlier books will be remembered by the children and may be reviewed in connection with this unit. In BOOK SIX a study of Portuguese and Spanish cultures might be furthered through comparison of songs from Brazil, where the language is Portuguese, with those of the other Latin American countries where Spanish is spoken.

**Brazil.****Songs.**

- The Crab, 37.  
 In the Early Morning, 41.  
 The Ship from Heaven, 43.  
 In Bahia, 217.  
 Flying Down to Rio, 221.

**Records.**

- Victor: Brazilian Songs (album).  
 Columbia: Native Brazilian Songs (2 albums).

**Sound Film.**

- University Depositories: South of the Border (Disney).

**Chile.****Songs.**

- The Meat-ie Seller, 42.  
 Song of the Infant Jesus, 114.  
 The Shepherdess, 218.  
 The Little Jar, 222.

**Records.**

- Decca: Latin American Folk Music (2 albums) songs from the various South American countries.

There are also songs from Argentina, Venezuela, and Panama in Book Six. The Peruvian songs are of Indian origin and are more closely related, musically and ethnically, to those of our North American Indians than to those of Portuguese or Spanish character. Any study of Latin-American music should include the song, "Americas, Shake Hands", page 38. The national anthems of the twenty-one countries of the Pan-American Union are published in a collection of songs which may be purchased from Clayton F. Summy, Chicago, Illinois. The Pan-American Union in Washington, D. C., publishes a number of helpful pamphlets dealing with Latin-American music.

These units were taken from the source book, by permission of the publisher.

**REFERENCES FOR TEACHERS**

- Annis, Elsie K.; Matthews, Janet. RHYTHMIC ACTIVITIES IN THE WORLD OF MUSIC. Boston, 17: Ginn and Company, 1944.  
 Armitage, T.; Dykema, P. W.; Pitcher, G.; Stevens, D.; Vendervere, J. L. TEACHERS' MANUALS OF WE SING, OUR LAND OF SONG, MUSIC EVERYWHERE. — A SINGING SCHOOL SERIES and ARTEXT PRINTS FOR A SINGING SCHOOL SERIES. Boston, 16: C. C. Birchard Company, 1943.

- Baldwin, Lillian. A LISTENER'S ANTHOLOGY OF MUSIC. VOLUMES I, II. New York, 3: Silver Burdett Company, 1949.
- Beattie, J. W.; Wolverton, J.; Wilson, G. V.; Hinga, H. GUIDES FOR BOOK FOUR, BOOK FIVE, AND BOOK SIX, OF THE AMERICAN SINGER SERIES and ALBUMS OF DECCA RECORDS FOR THE AMERICAN SINGER SERIES. Boston, 16: American Book Company, 1949.
- Brooks, B. Marion; Brown, Harry A. MUSIC EDUCATION IN THE ELEMENTARY SCHOOL. Boston, 16: American Book Company, 1946.
- Cline, Sarah Y. LET'S EXPLORE MUSIC. Boston, 17: Ginn and Company, 1940.
- Davison, Archibald T. "Sight Reading In Music In The Grades." HARVARD EDUCATIONAL REVIEW. VII (January, 1937.)
- Dykema, Peter W.; Cundiff, Hannah M. NEW SCHOOL MUSIC HANDBOOK. (Revised) Boston, 16: C. C. Birchard Company, 1950.
- Flagg, Marion. MUSICAL LEARNING. A GUIDE TO CHILD GROWTH. Boston, 16: C. C. Birchard Company, 1949.
- Glenn, Mabelle. MUSIC ACTIVITIES AND PRACTICES IN KINDERGARTEN AND ELEMENTARY GRADES. Boston, 17: Ginn and Company, 1940.
- Hughes, Dorothy. RHYTHMIC GAMES AND DANCES. BASIC ACTIVITIES FOR ELEMENTARY GRADES. Boston, 16: American Book Company, 1942.
- Hunt, Beatrice A.; Wilson, Harry R. SING AND DANCE. Chicago, 5; Hall & McCreary Company, 1945.
- Krone, Beatrice P. MUSIC FOR THE NEW SCHOOL. Chicago, 6; Kjos Music Company, 1941.
- Leavitt, Helen S.; Freeman, Warren S. RECORDS FOR THE ELEMENTARY SCHOOL. New York, 10: Oliver Durrell, Inc., 1949.
- Leavitt, Helen S.; Hartshorn, William C.; PRELUDE, PROGRESS, AT HOME AND ABROAD, NEW HORIZONS of the MAKING FRIENDS WITH MUSIC SERIES and THE PILOT, THE MENTOR of the MAKING FRIENDS WITH MUSIC SERIES. Boston, 17: Ginn and Company, 1940.
- McDermith, Clark W.; Murphy, George H.; and others. "Course of Study in Music Kindergarten — Grade Twelve." Salem, Massachusetts: School Committee, 1945.
- Morgan, Hazel Nohavec. MUSIC EDUCATORS SOURCE BOOK. Chicago, 4: Music Educators' National Conference, 1948.
- Mursell, James L.; "Reading Music." NATIONAL SOCIETY FOR THE STUDY OF EDUCATION. THIRTY-FIFTH YEARBOOK, 1936.
- Mursell, James L. EDUCATION FOR MUSICAL GROWTH. Boston, 17: Ginn and Company, 1948.
- Mursell, James L. MUSIC IN AMERICAN SCHOOLS. New York, 3: Silver Burdett Company, 1943.
- McConathy, O.; Morgan, R. V.; Mursell, J. L.; Bartholomew, M.; Bray, M. F.; Miessner, W. O.; Birge, E. B. TEACHERS' MANUALS FOR INTERMEDIATE GRADES. BOOK FOUR, BOOK FIVE, AND BOOK SIX OF NEW MUSIC HORIZONS SERIES. New York, 3: Silver Burdett Company, 1948.
- Pierce, Anne E. "Music of the United Nations." University of Iowa Extension Bulletin Number 592. (November 1, 1945)
- Pitts, Lilla Belle; Glenn, Mabelle; Watters, Lorain E. TEACHING GUIDES, AND BOOK FOUR, BOOK FIVE, AND BOOK SIX OF OUR SINGING WORLD SERIES. Boston, 17: Ginn and Company, 1950.

- R.C.A. Manufacturing Company. VICTOR RECORDS. ALBUMS FOR ELEMENTARY SCHOOLS. Camden, New Jersey. Educational Department, 1947.
- Shephard, W. T. "Determining a Fair Balance Between Music Reading and Skills, and Social Recreational Singing." Chicago, 4: Music Educators National Conference Year Book, 1934.
- Small, A. M. "BIBLIOGRAPHY OF RESEARCH STUDIES IN MUSIC EDUCATION." Chicago, 4: Music Educators National Conference, 1949.
- Wright, Frances. ELEMENTARY MUSIC EDUCATION. Los Angeles: Lymanhouse, 1939. Teachers College, College University. Teacher's Lesson Unit Series Number Forty-One. 1946.
- SPECIFIC REFERENCES FOR TEACHERS IN SCHOOLS IN SMALL COMMUNITIES.
- Annett, Thomas. MUSIC IN THE RURAL SCHOOL. Boston, Boston Music Company, 1938.
- Beattie, J. W. and others. COMBINED GRADES BOOK. ALBUMS OF DECCA RECORDS FOR BOOK TWO, BOOK THREE, BOOK FOUR, BOOK FIVE, AND BOOK SIX OF THE AMERICAN SINGER SERIES. Boston, 16: American Book Company, 1947.
- Davison, A. T.; Davis, K. K.; Kempf, F. W. SONGS OF FREEDOM. Boston: Houghton Mifflin Company, 1942.
- Dykema, P. W.; Pitcher, Gladys; Stevens, D.; Vandervere, J. L. HAPPY SINGING. GRADES I-IV. MUSIC IN THE AIR. GRADES I-VIII. ARTEXT PRINTS. A SINGING SCHOOL SERIES. Boston, 16: C. C. Birchard Company, 1947.
- Hood, M. V.; Gildersleeve, G.; Leavitt, H. S. ON WINGS OF SONG (Book). ON WINGS OF SONG IN THE CLASSROOM (Teacher's Manual). THREE ALBUMS OF VICTOR RECORDS FOR ON WINGS OF SONG. Boston, 17: Ginn and Company, 1947.
- Kinscella, H. G.; Tierney, E. M. MUSIC IN THE SMALL SCHOOL. The Small School in Action Series. Lincoln, Nebraska: The University of Nebraska, 1939.
- McConathy, O.; Miessner, W. O.; Birge, E. B.; Bray, M. E. MUSIC IN RURAL EDUCATION. New York, 3: Silver Burdett Company, 1937.
- McConathy, O.; Morgan, R. V.; and others. "Radio in the Schoolroom." New Music Horizons Bulletin #1. NEW MUSIC HORIZONS BOOK SIX. New York, 3: Silver Burdett Company, 1946.
- McConathy, Osbourne, and others. NEW MUSIC HORIZONS. ONE BOOK COURSE. TWO BOOK COURSE. New York, 3: Silver Burdett Company. (In preparation.)
- Oberndoffer, A. F.; M. E.; Andersen, A. O. THE NEW AMERICAN SONG BOOK. Pan-American Edition. OUR HERITAGE IN SONG. Chicago, 5: Hall & McCreary, 1941.
- Stevens, David. LATIN AMERICAN SONGS. Unison and Two-Part with Accompaniments. Boston, 16: C. C. Birchard Company, 1941.
- Wilson, H. R.; Leeder, J. A.; Gee, E. W. MUSIC AMERICANS SING. LOG (WORKBOOK) FOR MUSIC AMERICANS SING. New York, 3: Silver Burdett Company, 1949.
- Wilson, Harry R. CHORAL PROGRAM SERIES. BOOKS I, II. New York, 3: Silver Burdett & Company, 1949.
- Wofford, Kate V. MODERN EDUCATION IN THE SMALL RURAL SCHOOL. New York: The Macmillan Company, 1938.
- Zanzig, Augustus D. SINGING AMERICA. Vocal Edition. Edition with Accompaniments. Boston, 16: C. C. Birchard, 1941.

**CHAPTER XIV.****PHYSICAL EDUCATION.**

Page

<b>Introduction</b> . . . . .	260
Major Objectives of Physical Education.	
General Suggestions.	
<b>Overview</b> . . . . .	262
Areas of Growth.	
Major Fields.	
Specific Objectives.	
Overview Chart.	
<b>Material by Grades</b> . . . . .	264
Introduction to Games.	
Games.	
Grade 4. Unit: Ball Skills.	
Introduction to Self-Testing Activities.	
Self-Testing Activities.	
Grade 5. Unit: Stunts and Tumbling.	
Introduction to Rhythmic Activities.	
Rhythmic Activities.	
Grade 6. Unit: Country Dancing.	
<b>Bibliography</b> . . . . .	277

**INTRODUCTION.**

## MAJOR OBJECTIVES.

Teaching the whole child is the paramount aim of education. Through physical education, an important phase of general education, numerous opportunities should be provided for mental, social, and emotional, as well as physical development.

It is important that every child gain understanding, attitudes, and appreciations which will be meaningful throughout life. Opportunity for growth and development of the whole child will be provided for, through a well-balanced program.

## GENERAL SUGGESTIONS.

The Twentieth Yearbook of the American Association of School Administrators recommends that a minimum of thirty minutes daily can profitably be used for class instruction in physical education activities. It also states that this time allotment should be in addition to that given for recess periods and other general school routines.

The recess period should supplement the regularly scheduled classes in physical education. It is comparable to the extra-curriculum program of upper school levels. It should be under teacher guidance, but the children should be allowed to organize and direct their activities.



The recess period should, to some extent, grow out of the class periods, but the teacher would do well to keep "hands off" as much as possible as far as direct domination is concerned. It gives her an excellent opportunity to observe play habits of children when they are left somewhat to their own devices. She can, at this time, determine needs for emphasis in her instruction period and can also observe the results of her teaching.

The recess period is an excellent opportunity for small group activities and very informal play. The only rules should be that every one be reasonably active and that safety elements and the sharing of space and equipment be observed. Committees may be organized to plan activities, take charge of equipment, etc.

Physical education is an essential part of the curriculum; therefore, depriving pupils of these lessons must never be used as a disciplinary measure.

Every child should have a complete medical examination yearly, conducted by a competent physician. The findings and recommendations should be available to the teacher immediately. In planning a pupil's activity program, the teacher should give careful consideration to the total health record. Pupils requiring modified activity should remain with the group whenever possible.

Children should be taught to relax completely at will. Knowing when to relax and using relaxation as one of the bases of well rounded development will promote more efficient use of the body. Good posture is balanced body mechanics and this is the basis for efficient movement. Emphasis in the program of physical education should be put on a proper proportion of relaxation with physical activity.

Authorities state that adequate outdoor and indoor space is essential. Whenever possible, activities should be conducted out-of-doors. To provide space and reasonable opportunity for teaching, all classes should not go to the playground at the same time; periods should be staggered. A playroom the size of two classrooms, providing unobstructed play space, is desirable indoors. This does not imply, however, that adequate programs cannot be carried out in regular classrooms.

Safety is of the utmost importance. Unnecessary hazards should be eliminated. Accidents may be prevented by good guidance, careful inspection of space and equipment, development of safety skills, and proper clothing. Sneakers or rubber-soled shoes are essential. Indoors, proper lighting, ventilation, and sanitation must be provided. Outdoors, a playground surface constructed of cork asphalt is recommended.

It is advisable that boys and girls be separated in the fifth and sixth grades for part of the time. Rhythmic activities afford excellent opportunities for co-education; self-testing and game skills usually show better results when the sexes are separated. Some activities may, necessarily, be seasonal; but equal emphasis should be planned for, in each of the major fields.

Selection of materials for the lesson may be influenced by the environment, equipment, and the child. A suggested list of minimum equipment is as follows:

A variety of balls	Bean bags
Playground balls — rubber	Indian clubs
Soccer balls	Air pump
Volley balls	Whistles
Soft balls	Measuring tapes
Basket balls	Stop watch
Football — junior size	First aid kit
Nets for games	Piano
Bats for softball	Percussion instruments
Net posts	Victrola
Jump ropes	Recordings
Tumbling mats	Reference books

Suggested procedures and progress charts for these activities may be found in the Curriculum Guide for Primary Grades.

This Guide does not include winter or water sports. These activities, however, are considered important to the child's education. They have been omitted only because existing conditions are not favorable to their inclusion in the physical education class periods.

## **OVERVIEW.**

### AREAS OF GROWTH.

#### **Co-ordination and Power.**

Development of physical endurance and neuro-muscular skill occurs in this area through repeated large muscle activity. This makes increased demands on the organic systems of the body. In the entire curriculum, Physical Education alone provides opportunities for these activities. Aims in this area constitute major objectives of physical education.

#### **Socialization and Conduct.**

Socially acceptable self-direction of characteristic impulses or emotions is fundamental to successful group living. Physical education offers strategic opportunities for guiding the growth of the child in the thinking and emotional control needed in this self-direction. Constant emphasis should be given to social values. Pupils should develop good fellowship as well as leadership, should acquire respect for rules and officials, and should gain judgment in selection of good leaders.

#### **Creativeness.**

Feelings and ideas are readily expressed through bodily movement. Originally, games, stunts, and dances came from the creative expression of human beings. This quality should be kept alive in the experience of the children in our schools today.

Rhythm is basic to all human beings. It is first and most fundamentally experienced through the kinesthetic sense. Rhythmic movement should be developed in children as fully as possible through wide and varied experience. There are many opportunities for developing inventiveness in physical education and for increasing appreciation. It is the responsibility of the teacher to provide for growth in this area.

### MAJOR FIELDS.

The activities used to promote growth in these areas are classified in three major fields: **GAMES, SELF-TESTING ACTIVITIES,** and **RHYTHMIC ACTIVITIES.** They promote opportunity for wholesome activity arising out of the natural impulses. Participation in vital experiences satisfies the urge for physical activity.

### SPECIFIC OBJECTIVES.

In each area and major field there are opportunities for definite but varied learnings which are the specific objectives of physical education. Obviously the development of **HABITS AND SKILLS** is the core, but since the whole child is learning, there are **KNOWLEDGES AND UNDERSTANDINGS,** as well as **ATTITUDES AND APPRECIATIONS** closely related to the activities which are of vital importance to his total growth. All of these objectives must be kept constantly in the mind of the teacher, if the physical education program is to be truly a phase of education and not merely an exercise period.

**GRADES 4-6.**  
**OVERVIEW CHART**

GROWTH IN CO-ORDINATION AND POWER THROUGH	GRADE IV	GRADES V AND VI
<b>Games</b>	Developing power and control of force in handling objects; strategy and daring; skill in competitive activities.	Developing skill and strength in active games; in healthy competition.
<b>Self-Testing Activities</b>	Developing balance, agility in stunts; ability in handling objects; ability in hanging, climbing and jumping; ability in simple athletic events.	Same as Grade IV with stress on recognition of advantages of well balanced body. Posture improvement through self-analysis using mirrors.
<b>Rhythmic Activities</b>	Studies in meter, note values, and phrasing, using vigorous stunt-like movements, rhythmic formations, dance movements to bring about improved body alignments.	Improvement in skill and co-ordination, athletic and stunt-like rhythms and dances showing prowess and skill. Rhythmic formations.
GROWTH IN SOCIALIZATION THROUGH		
<b>Games</b>	Learning leadership and followership in games and competitive activities. Playing games of other peoples.	Learning to officiate in games and contests. Running a tournament of games and contests. Planning games for social recreation.
<b>Self-Testing Activities</b>	Learning to be officials for athletic events.	Planning or running a meet or field day of athletic events. Learning to give directions.
<b>Rhythmic Activities</b>	Experiences in group dancing, in dancing with partners, in traditional folk and social dances.	Experiences in group dancing. Dancing with partners, chiefly in dances with frequent change of partners, in social "mixers", folk dances, and social dances. Planning a dance festival or program.

## OVERVIEW CHART (continued)

GROWTH IN CREATIVENESS THROUGH	GRADE IV	GRADES V AND VI
<b>Games</b>	Analysis of rules of games, and ways of changing rules to meet varying situations.	Selective events, planning the program, etc., for a tournament or field day. Devise way in which equipment for games may be "homemade".
<b>Self-Testing Activities</b>	Study and analysis of rules of athletic events.	Selecting events, planning program, promoting publicity, etc., for a meet or field day.
<b>Rhythmic Activities</b>	Inventing rhythmic stunt-like movements, dances with "tricky" steps, rounds in movement, selecting a creative accompaniment.	Inventing simple pattern dances. Creating dances for special occasions (plays, programs, etc.).

**MATERIAL BY GRADES.**

## INTRODUCTION TO GAMES.

The growing child in the fourth, fifth, and sixth grades is going through a period of rapid physical as well as mental, social, and emotional development. Games constitute a large part of the physical educational program. Skills and group activities are essential for growth.

Group safety demands careful and frequent inspection of play areas and equipment. Proper attire and good leadership are also essential factors in safety.

The following suggestions have been prepared to assist the teacher in planning the games section of the program.

GAMES		GRADES 4 — 6
Classroom Games		Areas of Growth Key:
Small Group Games		1 Co-ordination and Power
Large Group Games		2 Socialization
Game Skills		3 Creativeness
Lead-Up Games		*Require no special equipment
<b>Activities</b>	<b>Reference</b>	<b>Area of Growth</b>
<b>Classroom Games</b>	(Books at end of list)	
Hit the Club	2 p61	1
*Number Race	2 p74	1
Spin the Platter	2 p315, 4 p221	1-2-3
*Black Magic	2 p317	1-2-3
*Find the Leader	2 p319	1-2
*Do This and Add Something	2 p318	1-2-3
*Good Morning	2 p321	1-3
*Gossip	2 p321	1-2

<b>Classroom Games continued</b>	<b>References</b>	<b>Areas of Growth</b>
Hide in Sight	2 p322	1-2
*Who am I?	2 p331	1-3
*Boiler Burst	1 p167, 4 p224	1-3
*Chair Tag	4 p240	1
Bean Bag Ring Throw	1 p140	1
*Around the Row	1 p140	1
*Stoop and Stretch	1 p142	1
*Head Balancing	4 p7	1
Jump the Stick	4 p260	1
*Stunt Relay	4 p180	1-3
*Slipper Relay	4 p182	1
Cards in the Hat	4 p61	1
<b>Small Group Games</b>		
Buddy Spud	2 p46, 4 p256	1
*Barley Break	4 p166, 4 p253	1-2
Duck on the Rock	1 p269, 2 p54, p254	1
Jump the Shot	4 p259, 2 p65	1-3
Keep Away	1 p270, 2 p66, 4 p487	1
Center Keep Away	2 p49	1-3
Center Stride Ball	1 p231, 2 p85	1
Swatter Pin Guard	4 p230	1-3
Club Snatch	2 p51, 4 p217	1-3
*Poison	2 p79	1
Club Guard	2 p50	1-3
Goal Ball	2 p60	1
*Spoke Tag	4 p219	1
*Touch	4 p146	1-3
<b>Large Group Games</b>		
*Street and Alleys, or Maze	2 p117, 4 p234	1-2
Poison Circle	4 p258	1
*Vis-a-Vis	1 p234, 4 p225	1-2
*Cap Tag	4 p240	1
*Chain Tag	1 p315, 4 p271, 2 p83	1-2
*Hopping Numbers Change	4 p220	1
*Last Couple Out	4 p239	1-2
Double Newcomb	2 p101	1-2
Rounders	4 p327	1-2
*Poison Seat	4 p222	1-2
*Chinese Wall	4 p269	1-2
*Third Man	4 p243	1-2
Hit or Out	1 p242	1
Club Rush	4 p227	1-2
*Tip Cat	4 p346	1-3
*Run and Sit Relay	4 p169	1-2
*Loop the Loop Relay	4 p170	1-2
*In and Out Relay	4 p172	1-2
*All Up Relay	4 p173	1-2
*Circle Post Relay	4 p170	1-2

<b>Game Skills</b>	<b>Reference</b>	<b>Areas of Growth</b>
<b>Soccer</b>		
Dribbling	2 p145	1-2
Kicking	2 p145, 4 p67	1-2
Trapping Stop	2 p146	1-2
Blocking Stop	2 p147	1-2
Lateral Passing	2 p147	1-2
<b>Touch Football</b>		
Passing	2 p166	1-2
Centering	2 p167	1-2
Receiving Passes	2 p167	1-2
Place Kicking	2 p167	1-2
Punting	2 p167	1-2
Receiving a Kick	2 p168	1-2
<b>Volleyball</b>		
Underhand Pass	2 p179	1-2
Overhand Pass	2 p179	1-2
Juggle	2 p180	1-2
Volley	2 p180	1-2
Serve	2 p180, 4 p63	1-2
<b>Basketball</b>		
Toss Up	4 p157	1-2
Chest or Push Pass	2 p133, 4 p45	1-2
Side Throw, one arm	4 p45	1-2
Catch	2 p133	1-2
Dribble	2 p133	1
Side Underarm Throw	4 p96	1-2
Foul Throw	1 p205	1
<b>Softball</b>		
Throwing	2 p157, 4 p43	1-2
Catching	2 p157, 4 p43	1-2
Pitching	2 p158, 4 p42	1-2
Batting	2 p158	1-2
<b>Lead Up Games</b>		
<b>Soccer</b>		
Alley Soccer	2 p151	1-2
Line Soccer	4 p403	1-2
Corner Kick Ball	1 p202, 4 p405	1-2
Circle Soccer	1 p194, 2 p148, 4 p407	1-2
Pin Soccer	1 p157, 2 p149, 4 p410	1-2
Foot Dribble Relay	2 p147, 4 p197	1-2
Rotation Soccer	1 p199, 4 p411	1-2
Soccer Bowling	4 p111	1-2
Soccer Dodgeball	1 p161, 4 p264	1-2
Soccer Tag	1 p352, 4 p259	1-2
Simplified Soccer	1 p287, 2 p153, 4 p403	1-2

**Lead Up Games** continued**Touch Football**

Drive Back	2 p170	1-2
Twenty-Yard Touch Football	2 p171	1-2
Football Target Punt	4 p158	1-2
Simplified Touch Football	2 p171	1-2
Football Snatchball	4 p158	1-2

**Volleyball**

Bombardment	2 p93	1-2
Bounce Volleyball	4 p371	1-2
Balloon Volleyball	4 370	1-2
Sponge Ball	1 p290, 4 p373	1-2
Ring Volleyball	4 p378	1-2
Crab Volleyball	4 p394	1-2
Spot Ball	4 p394	1-2
Curtain Ball	4 p493	1-2
Newcomb	2 p184, 4 493	1-2
End Ball	1 p153, 4 p495	1-2-3
Juggle Volleyball	2 p184	1-2
Foot Volleyball	1 p248	1-2

**Basketball**

Corner Ball	4 p497	1-2
Boundary Ball	1 p146, 2 p94, 4 p489	1-2
Keep Ball	4 p487	1-2
Ten Catches	4 p488	1-2
Guard Ball	4 p489	1-2
Center Miss Ball	4 p489	1-2
King Ball	4 p490	1-2
Pin Guard	4 p490	1-2-3
Round Ball	4 p493	1-2
Captain Ball	1 p193, 2 p136, 4 p499	1-2
Pin Basketball	1 p244, 4 p506	1-2
Five, Three, One	4 p49	1-2
Talley Basketball	2 p143	1-2

**Softball**

One Old Cat	1 p157, 4 p326	1-2
Three Grounders of a Fly	4 p327	1-2
Beat Ball	4 p329	1-2
Hit Pin Baseball	1 p279, 4 p342	1-2-3
Baseball Twenty-One	4 p329	1-2
Kick Baseball	4 p322	1-2
Batball	1 p151, 4 p338	1-2
German Batball	4 p338	1-2
Soccer Baseball	4 p333	1-2
Long Ball	1 p155, 4 p336	1-2
Schlag Ball	4 p342	1-2-3
Triangle Soft Ball	2 p162	1-2

**References****Areas of Growth**

## REFERENCES.

- 1 — Neilson, N. P., and Van Hagen, Winifred. PHYSICAL EDUCATION FOR ELEMENTARY SCHOOLS. New York: A. S. Barnes & Co., Inc., 1934.
- 2 — Salt, E. Benton, et al. TEACHING PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOLS. New York: A. S. Barnes & Co., Inc., 1942.
- 4 — Mason, Bernard S., and Mitchell, Elmer D. ACTIVE GAMES AND CONTESTS. New York: A. S. Barnes & Co., Inc., 1935.

**GRADE 4.****UNIT: BALL SKILLS.**

MAJOR FIELD: GAMES.

**Description of Situation.**

4th Grade — 25-35 girls.

Medical and cumulative guidance records available.

Past experience in ball handling limited to informal catching and throwing practice and simple ball games.

Time allotment for this unit: two of the regular five weekly physical education periods for a period of six weeks.

Environment: outdoor or indoor play area 40' x 60' desirable.

Equipment: 4 soccer balls (volley balls or basketballs could be used). Sneakers or rubber-soled shoes required.

**General Statement.**

Every boy and girl should be given the opportunity to develop at least average skill in handling balls. A good physical education program will provide instruction in the correct form of throwing and catching balls and should provide time to practice these fundamental skills. In grade 4, specific passes are learned and opportunities should be provided to use these passes in game situations.

**Specific Objectives.**

Learn the correct form of different passes.

Know the uses of the passes.

Know the kind of balls used in different games.

Know how greater distance and accuracy may be achieved.

Learn the correct way to catch different passes.

Know the rules of the games.

Know what good team play means.

Learn when and with what speed to throw a ball to a person.

Learn the care of equipment.

**Probable Indirect Learnings.**

Improvement comes through practice.

The value of skill in ball handling is recognized.

Good leadership is respected.

Games are played for fun.

Self-confidence comes with praise and encouragement.

Courtesy and consideration for teammates and opponents improve team play.



**Introduction.**

- Film showing ball skills.
- Visit to Junior or Senior High School basketball game.
- Discussion of the popular games played in America with balls.
- Discussion of spectator behavior at Major League baseball games, hockey, and football.

**Activities.**

- Instruction in passes: chest pass, bounce pass, one hand overhand, two hand overhand.
- Instruction in correct form of catching.
- Rules and organization of relay teams.
- Scoring, timing, refereeing relay races and team games.
- Relay races using different passes.
- Group games using balls.
- Team games using balls.

Relays	Games
Cross Over Relay	Boundary Ball
Arch Ball Relay	Dodge Ball
Over and Under Relay	Kick Ball
Pass and Squat Relay	Bat Ball
Run, Toss, and Catch Relay	End Ball
Stride Ball Relay	Long Ball
Odd and Even Relay	Softball
Zigzag Bounce Relay	Prisoner's Base
	Indian Club Guard
	Soccer Dodge Ball
	Red White and Blue

**Evaluation.**

- Observation of the following:
  - Do pupils use passes in games?
  - Are passes executed in good form?
  - Is good sportsmanship evident?
  - Have good leaders been developed?
  - Do students enjoy playing?
  - Is respect for umpires' decisions shown?
  - Do the children see that all the members of their class have an equal opportunity to play?
  - Do children know and understand the rules and procedure of team games?
  - Has co-operative team spirit been developed?

**REFERENCES.**

- Neilson, N. P., and Van Hagan, Winifred. PHYSICAL EDUCATION FOR ELEMENTARY SCHOOLS, New York: A. S. Barnes & Co., 1930.
- Salt, E. Benton, et al. TEACHING PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL, New York: A. S. Barnes & Co., 1942.

**INTRODUCTION TO SELF-TESTING ACTIVITIES.**

These are activities in which the primary drive is measurement of one's own achievement. Basic elements are courage, perseverance, agility, balance, flexibility, and strength.

In the following lists, an attempt has been made to arrange for progression in self-testing

activities. Many of the skills can be demonstrated by trained pupil-leaders. The class may be arranged in small groups.

Evaluation may be made by testing, by keeping charts, or by teacher observation. Safety factors should be stressed. Pupils having early success in activities should be encouraged to help others. Suitable play clothes and sneakers or rubber-soled shoes are necessary.

Track and field events are not included here, because most schools lack adequately prepared areas necessary for safety, and the special equipment required.

#### SELF-TESTING ACTIVITIES.

Activities with Balls

Activities with Mats

Activities without Equipment

GRADES 4 — 6.

Areas of Growth Key:

1 Co-ordination and Power

2 Socialization

3 Creativeness

<b>Activities with Balls</b>	<b>References</b>	<b>Areas of Growth</b>
<b>Soccer</b>	(Books at end of list)	
Place Kick for Distance	1 p 250, 4 p67	1-2
Punt for Distance	4 p67	1-2
Place Kick for Accuracy	4 p67	1-2
Throw for Distance	4 p45	1-2
Kick for Goal	1 p213	1-2
Dribble and Kick for Goal	1 p250	1-2
Dribble and Lateral Passing	2 p147	1-2
<b>Touch Football</b>		
Passing to an End	2 p168	1-2
Offensive and Defensive Forward		
Pass Play	2 p169	1-2
Passing for Distance	2 p169	1-2
Punt for Distance	4 p66	1-2
Place Kick for Distance	4 p66	1-2
Place Kick for Accuracy	4 p66	1-2
Drop-Kick for Accuracy	4 p66	1-2
Drop-Kick for Distance	4 p66	1-2
<b>Volley Ball</b>		
Serve for Accuracy	4 p63	1-2
Juggle Practice	2 p182	1-2
<b>Basketball</b> —Equipment includes baskets		
Pass for Accuracy	1 p205, 4 p446	1-2
Shuttle Passing Practice	2 p134	1-2
Shuttle Dribble Practice	2 p134	1-2
One Line Shooting Practice	2 p134	1-2
Goal Throw	4 p447	1-2
Long Shots	4 p447	1-2
Shooting Against Time	4 p448	1-2
<b>Softball</b>		
Pepper	2 p158	1-2
Batting Practice	2 p159	1-2
Infield Practice	2 p159	1-2
Playing Catch	2 p159	1-2
Target Throw	1 p214	1-2

**Softball**

Throw for Distance	4 p40	1-2
Throw for Accuracy	4 p40	1-2
Pitch for Accuracy	4 p41	1-2
Throw and Catch	4 p42	1-2

**Activities with Mats****Individual Stunts**

	Reference	Areas of Growth
Log Roll	2 p289, 3 p22	1
Rising Sun	2 p289	1
Upswing	3 p23	1
Human Ball	2 p288, 3 p34	1
Clicks	3 p27	1
Full Squat	1 p346	1
Frog Head Stand	1 p143, 2 p288, 3 p66	1
Knee Dip	1 p188, 3 p31	1
Forward Roll	1 p143, 2 p288, 3 p50	1
Knee Walk	3 p47	1
Tangle	3 p33	1
Upspring	3 p27	1
Nose Dive	3 p34	1
Backward Roll	1 p144, 3 p55	1
Jump Over Foot	3 p28	1
Headstand	1 p189, 3 p68	1
Cartwheel	1 p144, 3 p71	1

**Couple Stunts**

Rocking Chair	2 p291	1-2
Stomach Balance	2 p292	1-2
Back Spring	1 p189	1-2
Indian Wrestle	1 p230, 2 p296, 3 p113	1-2
Sitting Balance	1 p255, 2 p291, 3 p143	1-2
Arch	2 p299	1-2
Thigh Mount	3 p127	1-2
Scooter	3 p103	1-2
Horizontal Stand	3 p126	1-2
Triangle	3 p127	1-2
Elephant Walk	1 p256, 2 p291, 3 p121	1-2
Angel	2 p290	1-2
Knee Spring	1 p257	1-2
Knee Shoulder Stand	1 p311, 3 p133	1-2
Neck Flip	2 p291	1-2

**Group Stunts**

3-3-3	2 p299	1-2
Picket Fence	2 p299	1-2
Heart	2 p299	1-2
Stile	2 p299	1-2
Crown	2 p299	1-2
Rick Rack or Squash	2 p298, 3 p198	1-2
Pyramid for Five	2 p298	1-2
Web	2 p298	1-2

<b>Group Stunts</b>	<b>Reference</b>	<b>Area of Growth</b>
Gate	2 p298	1-2
Ten Pins	2 p299	1-2
<b>Activities without Equipment</b>		
<b>Individual Stunts</b>		
Measuring Worm	1 p44, 2 p289	1
Heel Click	1 p28, 3 p27	1
Jumping Jack	3 p22	1
Wiggle Walk	1 p308	1
Corkscrew	3 p31	1
Crab Walk	1 p142, 2 p288, 3 p44	1
Spider Walk	2 p289	1
Seal Slap	3 p30	1
Bear Dance	1 p45, 3 p37	1
Frog Dance	3 p36	1
Long Reach	1 p307	1
Push Up	1 p209, 3 p29	1
Push Up in Series	1 p209	1
Turk Stand	3 p26	1
<b>Couple Stunts</b>		
Wring the Dishcloth	3 p97	1-2
Churn the Butter	3 p103	1-2
Chinese Get-Up	1 p45, 3 p290, 3 p99	1-2
Double Walk	3 p100	1-2
Tandem	2 p292	1-2
Hand Wrestle	1 p257, 3 p115	1-2
Walrus Walk	3 p46	1-2
Hand Slap	3 p116	1-2
Hand Tug of War	3 p114	1-2
Finger Feat	1 p308	1-2
Three Legged Walk	3 p45	1-2
<b>Group Stunts</b>		
Walking Chair	3 p161	1-2
Skin the Snake	2 p293, 3 p162	1-2
Skin the Snake Backward	3 p162	1-2
Centipede	1 p190, 3 p168	1-2
Wooden Man	2 p293	1-2
Merry-Go-Round	2 p293, 3 p164	1-2
Pin Wheel	3 p166	1-2
1.	Neilson, N. P., and Van Hagen, Winifred. PHYSICAL EDUCATION FOR ELEMENTARY SCHOOLS. New York: A. S. Barnes & Co., Inc., 1934.	
2.	Salt, E. Benton, et al. TEACHING PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOLS. New York: A. S. Barnes & Co., Inc., 1942.	
3.	Horne, Virginia Lee. STUNTS AND TUMBLING FOR GIRLS. New York: A. S. Barnes & Co., Inc., 1943.	
4.	Mason, Bernard S., and Mitchell, Elmer D. ACTIVE GAMES AND CONTESTS. New York: A. S. Barnes & Co., Inc., 1935.	

**GRADE 5.****UNIT: STUNTS AND TUMBLING**

MAJOR FIELD: SELF TESTING.

**Description of Situation.**

5th Grade. 30 boys and girls.

Previous experience in stunts and tumbling.

Achievements and medical records available.

Time allotment for this unit: two of the regular five weekly physical education periods for six weeks during the winter season.

Environment: a regulation classroom with movable furniture.

Equipment: four mats, no regulation uniform — girls bring shorts and blouses — all children required to have sneakers or rubber soled shoes.

**General Statement.**

A good program of physical education covers a wide range of activities through which the needs of the children should be met. One of the major fields is self-testing. Opportunity for individual progress and achievement may be acquired through a good program of stunts under proper guidance and instruction.

**Specific Objectives.**

Develop agility, balance, flexibility, and strength.

Develop courage and initiative.

Present situations which allow opportunity for good leadership as well as good followership

Develop skill.

Teach care of equipment: storage and moving of mats; cleanliness of mats; method of combining them.

Teach safety techniques through leadership; spotters; traffic regulation; obedience and co-operation; suitable clothing.

**Probable Indirect Learnings.**

Better body control in all activities.

Character education through teamwork and courtesy.

Development of better poise and self-confidence.

Opportunity for individual success.

Group consciousness.

**Introduction.** Suggestions for Motivation and Orientation.

Moving picture of tumbling for beginners.

Exhibit of posters demonstrating stunts.

Short discussion of stunts already experienced in other grades.

Chart showing possible achievement for 5th Grade children.

**Activities.**

Division of the class into small groups.

Selection of leaders.

Discussion of safety measures.

Names of children and stunts placed on chart.

Stunts taught in class.

Pupils practice and present themselves for testing when ready.

Chart checked when child has passed the stunt.

### Individual Stunts.

- |                   |                  |
|-------------------|------------------|
| 1. Egg Sit        | 9. Tangle        |
| 2. Up Spring      | 10. Nose Dive    |
| 3. Bells or Click | 11. Human Ball   |
| 4. Turk Stand     | 12. Frog Dance   |
| 5. Push Ups       | 13. Knee Dip     |
| 6. Seal Slap      | 14. Forward Roll |
| 7. Cork Screw     | 15. Tripod       |

### Couple Stunts.

1. Chinese Get Up
2. Rocking Chair
3. Hand Wrestle
4. Hand Tug of War
5. Elephant Walk
6. Three Legged Walk
7. Scooter
8. Churn the Butter

### Optional Activities.

These activities are for those who have tried all, and passed the majority of the above skills.

Complete directions should be available on index cards.

Leaders may be trained to do these stunts and to assist others.

### Individual Stunts

1. Courage Jump
2. Elbow Roll
3. Folded Leg Walk
4. Jump the Foot
5. Knee Walk
6. Head Stand with Assist

### Couple Stunts

1. Indian Wrestle
2. Sitting Balance
3. Horizontal Balance
4. Flying Angel
5. Elbow Roll
6. Knee Shoulder Stand

### Group Stunts

- Skin the Snake
- Merry-go-round
- Pin Wheel

### Evaluation.

Evaluation should be carried on as the unit progresses through observation of performance.

It is not necessary to do the stunts in order.

Children who attain passing skill in the first stunts may go on to optional activities.

### Reference.

Virginia Lee Horne, STUNTS AND TUMBLING FOR GIRLS, New York: A. S. Barnes & Co., Inc., 1943.

## INTRODUCTION TO RHYTHMIC ACTIVITIES.

All physical activities are fundamentally rhythmic. There are certain ones in which the rhythmic factor is the predominant characteristic.

Rhythmic activity appeals to all ages. It is valuable in teaching the child to respond physically, mentally, and emotionally to rhythm. The activities vary according to the age, experience, and ability of the group. Material should be planned so that there is a progression throughout the grades.

The following suggestions are offered for the accompaniment of rhythm classes: a piano, recordings, or percussion instruments such as drums, wood blocks, or castanets. If it is impossible to secure the suggested accompaniments, clapping and singing may be used.

Opportunities for creative activity in rhythm should be presented. When individuals have had a background of movement experience, ideas should call forth creative movement which may lend itself to composition.

## RHYTHMIC ACTIVITIES.

## GRADES 4 — 6.

## Areas of Growth Key:

1. Co-ordination and Power
2. Socialization
3. Creativeness

Activity	Reference	New Basic Steps	Area of Growth
Broom Dance	1 p172, 2 p239	Walk, Skip	1-2-3
Vineyard Dance	5 p90	March	1-2-3
Gustaf's Skoal	2 p247, 5 p81		1-2
Paw Paw Patch	2 p265		1-2-3
Indian Braves	2 p250	Step, Hop	1-2
Irish Washerwoman	6 p17	Stamp, Swing	1-2
Virginia Reel	2 p281, 1 p225	Springy Run, Reel	1-2
Minuet	5 p85, 5 p119	Point, Curtsy	1-2
Dutch Couple Dance	1 p176, 5 p95	Dutch Step, Hop, Step, Hop	1-2
Here We Go 'Round the Mountain	2 p248		1-2-3
Crested Hen	1 p300, 5 p150	Stamp	1-2
Highland Schottische	1 p301, 5 p95	Schottische	1-2
Shoo Fly	1 p301, 6 p19		1-2-3
Oh Susanna	6 p21	Grand Right and Left	1-2
Sicilian Circle	1 p266, 5 p118 6 p33	Circle 4, Ladies Chain, Right and Left, Forward and Back	1-2
Palpankili	2 p264	Schottische	1-2
Sailor's Hornpipe	2 p273	Polka	1-2
Csebogar	1 p220, 2 p242 5 p93	Slide, Hungarian Turn	1-2
Little Man in a Fix	1 p262, 2 p257 5 p115	Run, Tyroler Waltz	1-2
Ace of Diamonds	1 p258, 2 p237	Polka	1-2
Captain Jinks	6 p25	Do-Si-Do, Allemande	1-2
Portland Fancy	6 p29	Circle 8, Right & Left	1-2
Red River Valley	6 p31	Right Hand Star	1-2
Take a Little Peek	6 p38	Lead to Right	1-2
Hi Ya	6 p40	Couple Separate, Couples Separate	1-2-3

## REFERENCES.

1. Neilson, N. P., and Van Hagen, Winifred. PHYSICAL EDUCATION FOR ELEMENTARY SCHOOLS. New York: A. S. Barnes & Co., Inc., 1934.
2. Salt, E. Benton, et al. TEACHING PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL. New York: A. S. Barnes & Co., Inc., 1942.
5. LaSalle, Dorothy. RHYTHMS AND DANCES FOR ELEMENTARY SCHOOLS. New York: A. S. Barnes & Co., Inc., 1928.
6. Mirkell, Miriam H. and Schaffnit, Irma K. PARTNERS ALL — PLACES ALL. New York: E. P. Dutton, Inc., 1949.

**GRADE 6.****UNIT: COUNTRY DANCING.**

MAJOR FIELD: RHYTHMIC ACTIVITY.

**Description of Situation.**

6th Grade. 32 boys and girls.

Age range, 10 to 13 years.

Previous experience: rhythmic activity including singing, games, rhythms, folk, and country dancing (Grades 1-6).

Medical and physical records available.

Environment: playroom 40' x 60' desirable.

Equipment: piano, victrola and records, and country dance books.

Time allotment: This unit covers two of the five regular 30 minute weekly periods for six weeks during the winter season.

**General Statement.**

The purpose of this unit is to inculcate understandings and skills which are associated with desirable appreciations of early American country dancing through the presentation of materials which have directly contributed to country dancing as we know it today.

**Specific Objectives.**

Develop a strong, flexible, and well co-ordinated body.

Become more adept in fundamental steps used in country dancing.

Promote social development.

Develop and enjoy rhythmic activity.

Develop an interest and appreciation of our early heritage.

**Probable Indirect Learnings.**

A wholesome girl and boy relationship.

Poise.

Courtesy.

Friendliness.

Desire for additional knowledge in this area.

**Introduction.**

Presentation of historical background.

Present status of country dance.

Demonstration, movies, pictures.

**Activities.**

Review of some country dances of previous grade, pupils' choice.

New Activities.

a. Captain Jinks

b. Red River Valley

c. Portland Fancy

d. Take a Little Peek

e. Hi-Ya

f. Calls and steps for each dance

g. New dances for enjoyment

h. Captain Jinks and Portland Fancy, good mixers



**Optional Activities.**

- Children "calling" country dances.
- A square dance party planned by the children.

**Evaluation.**

- Observation of improved co-ordination.
- Observation of enjoyment of country dancing.
- Check on achievement in simple basic steps such as Allemande, Do-Si-Do, Ladies Chain, Grand Right and Left, Forward and Back and Swing Partners. Knowledge of several formations.

## REFERENCE.

Kirkell, Miriam H., Schaffnit, Irma K.: PARTNERS ALL, PLACES ALL. 1949.

## GENERAL BIBLIOGRAPHY

- Neilson, N. P., and Van Hagen, Winifred. PHYSICAL EDUCATION FOR ELEMENTARY SCHOOLS. New York: A. S. Barnes & Co., Inc., 1934.
- Salt, E. Benton, et al. TEACHING PHYSICAL EDUCATION IN THE ELEMENTARY SCHOOL. New York: A. S. Barnes & Co., Inc., 1942.
- Horne, Virginia Lee, STUNTS AND TUMBLING FOR GIRLS. New York: A. S. Barnes & Co., Inc., 1943.
- Mason, Bernard S., and Mitchell, Elmer D. ACTIVE GAMES AND CONTESTS. New York: A. S. Barnes & Co., Inc., 1935.
- LaSalle, Dorothy. RHYTHMS AND DANCES FOR ELEMENTARY SCHOOLS. New York: A. S. Barnes & Co., Inc., 1928.
- Kirkell, Miriam H., and Schaffnit, Irma K. PARTNERS ALL — PLACES ALL.
- Note: For additional information concerning major sports, refer to the Official Sports Guides.
- Sources for audio-visual aids: Sehon, Elizabeth L., et al. PHYSICAL EDUCATION METHODS FOR ELEMENTARY SCHOOLS. Philadelphia, 1948.
- Sources for recordings for dances and games: Sehon, Elizabeth L., et al. PHYSICAL EDUCATION METHODS FOR ELEMENTARY SCHOOLS. Philadelphia, 1948.

**CHAPTER XV.****SAFETY EDUCATION.**

Page

<b>Introduction</b>	278
General Introduction.	
Integration with Other Subjects	
General Objectives.	
<b>Overview and Material by Grades</b>	282
Chart Showing Correlations for Grades 1 to 6.	
Chart Showing Correlations for Grades 4 to 3.	

**GENERAL INTRODUCTION.**

Evidence that man has failed to adjust satisfactorily to his changing environment is made patent by the appalling number of fatal and serious accidents caused by carelessness and ignorance in the use of new inventions and discoveries. The need for teaching accident prevention should be apparent to teachers and all others associated with children.

"Safety education is the training of children to avoid accidents to themselves and to prevent accidents to others. It involves the acquisition of a certain fund of information, the ability to apply the information to concrete safety situations, and the building up of habits which will result in desirable behavior . . . .

"Safety means something more than accident prevention — it means also conservation of all that goes to make life worthwhile — health, opportunity, and the material resources upon which life itself depends — safety is the opposite of waste . . . .

". . . Safety education means teaching the child to adjust himself to our modern civilization." (Safety Teaching in the Modern School, National Safety Council, Education Division.)

Everything in the program should make a contribution to the child's development, through his interests, needs and handicaps. From kindergarten through high school, a continuous program of safety education should be presented in order that the safety consciousness of the individual may be developed to its fullest possible extent.

Since safety permeates every experience and activity of a child, it must follow that it should permeate every subject of the curriculum and every activity of the school. Programs should provide opportunities for experiencing, initiating, planning and executing in as varied, stimulating, and natural environment as possible.

**INTEGRATION WITH OTHER SUBJECTS.**

Safety subjects with possible integrations are here shown:

- |                      |   |
|----------------------|---|
| 1. Community Safety  | —Opening Exercises<br>Health<br>Civics<br>English                                     |
| 2. Electrical Safety | —Science<br>Reading (Language Arts)<br>Home Economics<br>Industrial Arts<br>First Aid |

3. Farm Safety
  - Social Studies
  - Language Arts
  - Health
  - Home Economics
  - Industrial Arts
4. Fire Prevention
  - Opening Exercises
  - Assemblies
  - Social Studies
  - Language Arts
  - Health
  - Home Economics
5. First Aid
  - Social Studies
  - Language Arts
  - Science
  - Health
  - Physical Education
  - Home Nursing
6. Gas and Poisons
  - Science
  - Language Arts
  - Home Economics
  - First Aid
7. Home Safety
  - Social Studies
  - Language Arts
  - Science
  - Home Economics
  - Health
  - First Aid
8. Recreational Safety
  - Assembly
  - Clubs
  - Science
  - Language Arts
  - Health
  - Social Events
  - Physical Education
  - Art
  - Industrial Arts
9. School Safety
  - Opening Exercises
  - Assemblies
  - Social Studies
  - Language Arts
  - Clubs
  - Health
  - Social Events
  - Physical Education
  - Art
  - Industrial Arts

## 10. Traffic Safety

—Home room  
 Social Studies  
 Language Arts  
 Science  
 Industrial Arts

Safety teaching should be positive with emphasis being placed upon the safe thing to do. General exhortation, learning safety rules, slogans and songs, negative instruction, threats or use of fears, and forcing artificial situations in arithmetic, spelling and penmanship, are less effective ways of teaching safety. Demonstrations of correct bicycle riding, or smothering a fire, etc., dramatizations, particularly of original compositions, motion pictures and slides, oral or written lessons from posters, and a good example set by the teacher, are much more effective ways of teaching children to meet situations which may arise, in a satisfactory manner.

## GENERAL OBJECTIVES OF SAFETY EDUCATION.

1. To give children an understanding of situations involving hazard so that their behavior in these situations may be intelligent.
2. To develop habits of conduct which will enable children to meet the situations of daily life without accident.
3. To develop habits of conduct which will function in difficult situations and in times of crisis.
4. To eliminate all preventable accidents.
5. To develop skill in control of bodily movement.
6. To create right attitudes, including
  - a. Respect for law and officers of the law.
  - b. Willingness to assume responsibility for the safety of self and others.
  - c. Willingness to co-operate in organized efforts to secure safety.
  - d. Interest in the social significance of safety.
7. To develop a generation characterized by habits of carefulness.



## OVERVIEW CHART FOR GRADES 1-3.

AREAS OF GROWTH	MAJOR FIELDS	UNITS — GRADE 1.
KNOWLEDGE OF SAFETY RULES AND PRACTICES ESSENTIAL TO SAFE LIVING IN ENVIRONMENT.	Understandings of need for obedience to safety rules.	Social Studies—The School. Science—Outdoors Excursions. We Visit a Farm. Health—The Road to School.
	Of necessity for orderliness at home and at school.	Social Studies—Life in the Homes. The School.
	Of importance of bodily control.	Health—How We Spend our Play Time. Physical Education — Developing Ability to Manage Objects in Games.
	Of need for co-operation at home, at school, and in the community, for safety of all.	Social Studies—The School. *Co-operation with patrols and traffic officers.
	Of how environment and conditions affect living safely.	*Lessons in safety to be learned from wild animals.
APPRECIATION OF THE CONTRIBUTION TO SAFETY AND HEALTH MADE BY THE WORKERS IN THE COMMUNITY AND NATION.	Recognition of value of services of the school doctor, nurse, and dentist.	Social Studies — The School. Sciences—We take care of our bodies and watch them grow.
	Realization of importance of fire and police departments in the protection of life and property.	Social Studies — The School. *Visits made to school by members of fire and police departments.
	Knowledge of services rendered by Board of Health and sanitation workers.	

UNITS — GRADE 2.	UNITS—GRADE 3.
Social Studies — We Go for a Picnic or We have a Party. Having a Good Time. Becoming Acquainted with our Com- munity. Science—Exploring Out-of-Doors in the Winter.	Social Studies —How We Know About People in Other Communities. Science — We Make and Play with Toys that Move.
*Keeping furniture, toys, and equipment in proper places.	Social Studies — How People Provided Homes for Themselves.
Physical Education—Studies in Phrasing (Co-ordination and Power).	Science — We Make and Play with Toys that Move. Physical Education — Studies in Note Value (Co-ordination and Power).
*How boys and girls can help on the play- ground.	*Playing Games — Fair Play.
*Recognition of Poison Ivy.	*Recognition of poisonous plants — ivy, oak, and toadstools. Health—Outdoors throughout the year.
*A trip to the nurse's office. Explanation of use of contents of first aid cabinet.	*Demonstrations by nurse of how to remove a splinter and how to treat a blister.
Social Studies — The Workers who protect us. Art — Workers who protect us. Firemen. Health—Billy has the measles.	*How to report a fire. *What to do if clothing catches fire.
Health—Helping to keep our community clean.	*The Board of Health—doctors, nurses. *The sanitation workers.

AREAS OF GROWTH (Continued)	MAJOR FIELDS (Continued)	UNITS—GRADE 1 (Continued)
HABITS OF CAREFUL- NESS AND SKILL IN THE ELIMINATION OF ALL PREVENT- ABLE ACCIDENTS.	Safety consciousness at home, school, play, and on the highway.	*Opening exercises. Topics of seasonal safety.
	Realization of need of personal responsibility in preservation of life and property.	*The Fire Drill. *Care in handling matches and fire.
	Acquisition of skills for carrying on daily activities.	Social Studies — The School.
		Art — for visual interpretation of units.  Reading — Pictures and reading selections related to units.  Music — Songs of Safety.



UNITS—GRADE 2. (Continued)	UNITS—GRADE 3. (Continued)
Social Studies — Having a good time.	Science — We make and play with toys that move.
Social Studies — Having a good time.	*Care of bicycle and rules for correct riding. *How the patrol helps us.
Physical Education — Studies in Phrasing (Co-ordination and Power).	Physical Education—Studies in note value (Co-ordination and Power).
Art — for visual interpretation of units.	Art—for visual interpretation of units.
Reading — Pictures and reading selections related to units.	Reading — Pictures and reading selections related to units.
Music — Songs of Safety.	Music — Songs of Safety.

Unstarred topics indicate integration with Units in the Curriculum Guide.

Starred topics may be integrated with an appropriate subject or discussed during Opening Exercises.

## OVERVIEW CHART FOR GRADES 4-6.

AREAS OF GROWTH	MAJOR FIELDS	UNITS — GRADE 4.
KNOWLEDGE OF SAFETY RULES AND PRACTICES ESSENTIAL TO SAFE LIVING IN ENVIRONMENT.	Understandings of need for obedience to safety rules.	Science } Any unit in Social Studies } which excursions } are planned. *Safe bicycle riding. *Safe swimming.
	Necessity for orderliness at home and at school.	*Home Safety—Avoidance of home accidents through orderliness.
	Importance of bodily control.	Physical Education —Games and rhythmic activities to improve balance and co-ordination.
	Need for co-operation at home, at school, and in the community, for safety of all.	*The Fire Drill. *Co-operation with patrols, police, etc.
APPRECIATION OF THE CONTRIBUTION TO SAFETY AND HEALTH MADE BY THE WORKERS IN THE COMMUNITY AND NATION.	How environment and condition affect living safely.	*Safety in dealing with animals. *Safe play areas.
	Recognition of value of services of the school doctor, nurse, and dentist.	*What the various health services do for the protection of school children. *Simple first aid for slight injuries.
	Realization of importance of fire and police departments in the protection of life and property.	*Fire Protection in Early Days and Today.
	Knowledge of services rendered by Board of Health and sanitation workers.	*Services rendered by Board of Health and Department of Sanitation.

UNITS — GRADE 5.	UNITS — GRADE 6.
<p>*Safe bicycle riding. Health Education Planning a Picnic.</p>	<p>*Safe bicycle riding. *Safety in winter sports, and in swimming.</p>
<p>*Home Safety — Avoidance of home accidents through orderliness.</p>	<p>*Arrangement of a first aid cabinet or medicine closet.</p>
<p>Physical Education — Self-testing activities. Stress on advantages of a well-balanced body.</p>	<p>Physical Education — Games which develop control of bodily movement and automatic response to various situations.</p>
<p>*Responsibility for the safety of the younger children. *The Fire Drill.</p>	<p>*Causes of home accidents and methods of prevention. *School Boy Patrols. *The Fire Drill.</p>
<p>Social Studies — Conservation. Science — Spinners and Weavers. (Activity 8.) Science — Respect for Reptiles.</p>	<p>Social Studies — Conservation.</p>
<p>*Simple first aid. *Arithmetic — Development of original problems showing cost of health services in a community.</p>	<p>*Simple first aid. *What a boy or girl can do for an injured person and what should be left to a doctor.</p>
<p>*Arithmetic—Develop original problems based on Safety Council reports, loss of property by fire, etc.</p>	<p>*Arithmetic—Compute cost of fire protection. Construct graph showing comparison of national, state, and local accident statistics.</p>
<p>*Regulations of Board of Health and Department of Sanitation.</p>	<p>*Health and Safety measures in public buildings.</p>

AREAS OF GROWTH (Continued)	MAJOR FIELDS (Continued)	UNITS—GRADE 4 (Continued)
HABITS OF CAREFULNESS AND SKILL IN THE ELIMINATION OF ALL PREVENTABLE ACCIDENTS.	Safety consciousness at home, school, play, and on the highway.	*Care necessary in use of electricity and electrical appliances.
	Realization of need of personal responsibility in preservation of life and property.	Social Studies — Conservation.
	Acquisition of skills for carrying on daily activities.	Science — Building a Science Room —Activity 22. (Use of simple tools.)
		*Art—Plan, draw, and letter safety posters.
		*Language—Write letters; e.g., to safety agencies, requesting information on safety subjects and accident statistics.

UNITS—GRADE 5 (Continued)	UNITS—GRADE 6 (Continued)
*Home safety survey.	*Arithmetic — Simple graphs using accident statistics.
Science—Light, Approach 4. (Protection afforded by light clothing at night.) *Safety in winter sports and swimming.	*Safety in swimming and winter sports.
Science—Machines, Activity 5. (Safe use of tools.)	*Safe handling of tools in industrial arts and home economics.
*Draw large map of localities from which children come to school. Show traffic signals, police officers, patrol boys, crossings, etc. Show safest route for each child to travel.	*Illustrate safety booklet. *Paint scenery for a play. *Make puppets.
Language—Plan and give safety radio program.	*Language—Write articles on safety for school paper.

**CHAPTER XVI.****SCIENCE.**

Page

<b>General Introduction</b> . . . . .	292
<b>Overview Chart for Science in Intermediate Grades</b> . . . . .	296
<b>Introduction to the Work in Grades Four, Five and Six</b> . . . . .	300
<b>Grade 4</b> . . . . .	301
Summary of Work.	
Suggested Topics.	
How Does Your Garden Grow?	
Life in Pond and Stream.	
Spiders.	
Butterflies and Moths.	
Know Your Trees.	
Common Local Mammals and Their Habits	
Christmas Greens.	
Bird Life of Familiar Communities.	
Rocks and Minerals.	
Tracking Animals	
Weather: Maintaining Our Own Weather Bureau.	
Spring Awakening of Animals	
Winter Aspect and Spring Development of Woody Plants	
Sea Life.	
Spring Flowers of Woodland, Meadow, and Garden	
Building a Science Room.	
Plant and Animal Communities.	
<b>Grade 5</b> . . . . .	331
Summary of Work.	
Suggested Topics.	
Unit I. Spinners and Weavers.	
Unit II. Spore Bearers.	
Fungi and Lichens.	
Liverworts and Mosses.	
Ferns, Lycopodiums, Horsetails.	
Unit III. Land-Water Animals.	
Life History of the Dragon Fly.	
Frogs, Salamanders, Newts, Toads.	
Unit IV. Animals With Backbones.	
Respect for Reptiles.	
Mammals.	
Animal Pets.	
Unit V. Six Leggers.	
Grasshoppers and Their Kin.	
Ants.	
Unit VI. Gardens. Tame or Wild.	
Seeds.	
Fall Work in a Garden.	

**Grade 5 continued**

Page

Preparing for Winter.  
 House Plants.  
 Spring Work with Plants, Indoors and Out.  
 Save the Soil.  
 Soil.  
 Spring Flowers.

Unit VII. Giants of the Plant World.  
 Life Histories of Selected Tree Families.  
 Reforestation; Town Forests; Planting Trees.

Unit VIII. Birds.  
 A Study of Birds of Prey.  
 Nesting Birds.

Unit IX. Rock and Mineral Deposits.

Unit X. Water and Rainfall.

Unit XI. Stars and Planets.

Unit XII. Machines.

Unit XIII. Heat.

Unit XIV. Light

**Grade 6**

378

Summary of Work.

Suggested Topics.

Unit I. The Relation of Some Common Animals to Man.  
 A Tiny Soil Conditioner.  
 The Place of Predators in the World.

Unit II. Marine and Fresh Water Life.

Unit III. Plant Life.  
 Conserve That Plant.  
 Beneficial Bacteria, Molds, Fungi.  
 Landscaping Our School Grounds.

Unit IV. Insects.  
 Life of the Bee.  
 The Mosquito.  
 Control of Pests in the Home.

Unit V. Chemistry in the Home.

Unit VI. Junior Forest Rangers.

Unit VII. Fire: Friend and Foe.

Unit VIII. Birds.  
 Societies for the Scientific Study and Conservation of Birds.  
 Attracting Winter Birds.  
 Mysteries of Bird Migration.

Unit IX. Electricity.

Unit X. Air Pressure and Devices Dependent on Air Pressure  
 for Their Functioning.

Unit XI. Airplanes.

Unit XII. Great Scientists.

Unit XIII. Fresh Water Fish and Fishing.

Unit XIV. Living Out-of-Doors. Enjoy not Destroy.

**Bibliography**

423

## GENERAL INTRODUCTION.

In outlining a Guide in Science for the Elementary Schools of Massachusetts two problems loom large:

1. The great variety in the environments and their influence on the children throughout the state.
2. The enormous amount of material from which to choose in the broad field of science.

The child, with his ever present or easily aroused curiosity, is a good guide to the selection of science activities. For example:

1. Children love to be out-of-doors.
2. They are fascinated by the phenomena of nature.
3. They like motion and things that live and move.
4. They want to be active themselves.
5. They like to be the cause of things happening, to experiment and have things grow.
6. They love to collect things; to make things.
7. They are full of the spirit of adventure and exploration.
8. They love the unexpected.
9. Children like to be active members of a group — class, school, home, or community.

They like to feel that their contributions are vital to a group's undertakings.

Starting with this knowledge and guided constantly by the major objectives of education, the teacher can make selections from the broad fields of science that will satisfy these appetites, using materials near at hand or more remotely accessible.

To cultivate the child's natural desire for truth should be the main objective of science teaching. The aim of all science teaching is the development of the scientific method of thinking and action in accordance with it. This method precludes the acceptance of superstitious beliefs and half truths, and it eliminates guessing.

Science is "a fund of knowledge and a method of thought". The elementary school years are the time for laying a firm foundation for the beginnings of the "fund of knowledge". It is a period of exploration, for the children should have experiences in many branches of science, but a detailed study of none. Through the methods used while guiding the children's explorations, a "method of thought" will be gradually developed, which in the latter part of the elementary grades or in the Junior High School, will take on definite patterns of scientific thinking. The elementary school years are a time for opening the child's eyes, arousing his curiosity about many things, and orienting him to the whole great field of science. Selection for further study and concentration in later years can be made on the basis of these widely varying experiences.

## PURPOSE OF THE COURSE.

The purposes of this course are (1) to outline a sequential and expanding list of activities from age level to age level that will gradually develop the underlying principles in the many areas of science learning; (2) to list in statement form the expected outcomes of these activities; (3) to suggest the content needed to guide the children throughout these experiences. This last can be accomplished by means of a rich bibliography of references and a list of sources of materials.

## MAJOR OBJECTIVES.

1. To help children, through continuous and expanding science experiences, interpret their world and adapt themselves to the rapid changes taking place.



2. To give children the satisfaction of understanding what they see and hear.
3. To develop the ability to observe carefully, and within the capacities at a given age level, to think critically and draw conclusions after weighing evidence. To be open-minded for the reception of new evidence, whether it be confirmatory or contradictory of previous conclusions.
4. To give children objective information about themselves and proof of what leads to good personal and community health and hygiene.
5. To develop a desire in children to use our natural resources intelligently, and to give children an understanding of the true meaning of "conservation".
6. To give children a beginning understanding of machinery and the mechanical devices which surround them.
7. To give children an understanding of the order and organization of God's universe.
8. To give children, through their understanding of order and organization, a perception of Beauty, Truth, Goodness.

#### HOW TO USE THE MATERIAL.

It is the purpose of this course to indicate a wide variety of activities at each grade level for each concept outline. Thus selection can be wisely made. No teacher is expected to use them all.

**DETERMINATION OF ACTIVITIES.** Activities are decided in the light of

Background and interest of the teacher.

Location of school.

Materials available.

Season of year and variable factors in seasons from year to year.

The age of the group.

Previous experience of the group.

Peculiar interest of a particular group or at a particular time.

Specific community conservation needs or projects.

**AREAS OF EXPLORATION.** We may divide the field of investigation into (1) the world of living things; e.g., the area comprehended by biological science (animal life and plant life); (2) the world of non-living things; e.g., the area comprehended by physical science (physics, chemistry, geology and astronomy).

The grade level suggestions should help the teacher know what the probable previous experiences of her pupils have been and plan her work so as to lead her pupils to further experiences. They are intended simply as a guide to a progressively developing program of science experiences.

The teacher should feel free to select activities above or below the grade level, if in her judgment the children's point of development, the activities in progress, or some environmental condition demands it. The same scientific truth can be developed through a variety of activities.

#### SUGGESTED PROCEDURES.

The units vary in length and in richness of content. Many of the units can be developed as outlined in a week or two or even less, if the teacher wishes. With other units, especially the outdoor units, different procedures might be followed.

Some of the units may be carried on throughout the year with intensive activity coming in the fall, again in the winter, and yet again in the spring. During the intervening periods, the teaching will be incidental to some other interest. The children will care for animals and plants; watch the terrarium, aquarium, cocoons, chrysalises, results of experiments set up, and keep records of weather and other outdoor observations; help arrange new exhibits or work with those that the teacher arranges; read and write stories about interesting observations or developments (a moth emerging, frog's eggs hatching); maintain the bird feeding station; continue adding to collections started during the intensive study; keep records.

Sometimes it may be advisable to take but one or two topics under a unit heading, for example, Grade 5 "Gardens Tame and Wild". When complete units are not undertaken, the science work must be so organized that a well balanced year is planned — that a good balance is maintained between the biological and physical sciences and also within each field, for example, that work is taken in both the areas of plant and animal life.

The following balance between the biological and physical sciences is suggested:

#### PERCENT OF TOTAL TIME ALLOTTED TO SCIENCE TEACHING:

	Biological Science		Physical Science
Grade 4	83 $\frac{1}{3}$ %	to	16 $\frac{2}{3}$ %
Grade 5	75 %	to	25 %
Grade 6	66 $\frac{2}{3}$ %	to	33 $\frac{1}{3}$ %

Some of the topics listed in Grade 4 or under Unit headings in Grade 5 and 6 will probably take more than one class period, ("a period" is based on 2-hour blocks of time) for its complete development. It is conceivable that some might become of such interest to a class as to need extended time or that others, because of scarcity of material or lack of special interest, might take but one.

Specific situations may make the complete development of certain units impossible. The teacher, conscious of the limitations of her own position, will select from these units the sections that best fit her program and write her own unit, using the fuller unit to guide her.

An all-school activity which is valuable, both for the children and the school, is the equipping of a science room. Here books, magazines, pamphlets, pictures, and other visual aids, and equipment may be kept.

Classes may make booklets; e.g., dated records of trips taken and observations made; pictorial field guides; scripts of "radio" talks; science leaflets; circulars on various topics, such as "How to Maintain a Balanced Aquarium", or "Control of Pests in the Home".

Other valuable materials which may be prepared are plans for school ground landscaping; maps of local soil conservation projects, town forest, and bird migration; collections; charts; habitat groups; electrified identification boards; "codes" for picnicking; collecting and using plants for bouquets and decorating.

When children know that something which they are doing may be of enough value to become a part of a school's permanent equipment there is an added incentive for accurate, careful work.

The "science room" might, at first, be merely a closet, but as the library of books and pictures grows and visual aids increase, a small room might be set aside just for science materials. It might grow into a science center where small groups go to study and work. In this way, many more books and other reference and visual aid materials can be made available to everyone.

At all times and on all age levels "Hobbies" should be encouraged by class or school exhibits of individual hobbies, by opportunity to pursue study connected with an individual hobby,

by providing rich experiences in all fields of science, which may stimulate hobbies, and by help and encouragement to those individuals who already have a hobby.

#### SPECIAL CLASSES.

Teachers of special classes will find much helpful material in the Science Units. Children with subnormal intelligence, reading disabilities, certain physical handicaps, or social maladjustment present problems, which demand special handling. Abnormal children need work with concrete things. They learn more through seeing and hearing than through reading. For children who have difficulty in reading but are normal otherwise, motivation is often provided by interesting scientific material.

Study in the field of science deals with real things — trips, collections, experiments; actual work in the soil, with trees, with water, and with live animals. It isn't just reading and talking; it is **doing**.

These children are usually completely disinterested in the material within their reading ability, which is tragically below their interest level and social maturity. Yet they will turn to and learn from material which is beyond their grade level when they see a purpose and a need for such reading.

Miss Mary R. Cox, teacher of a special class at the Ledge St. School, Worcester, worked out an excellent unit — "Safety and Conservation When Hunting and Fishing" with a group of early adolescent boys with marked reading disabilities and low intelligence.

During the development of this unit these children collected pictures and advertisements. They obtained books from the public library. They wrote letters to Fish and Game Departments and Sportsmen's Clubs for information and used the material received. They collected newspaper articles giving news and information concerning fishing and hunting. They saw the announcement in the paper of a wildlife film and attended the presentation. They went on trips. They interviewed authorities. They wrote their own articles on various phases of the subject. Colorful, artistic, and accurate dioramas were prepared by children with special ability in art.

Although this was done on the upper elementary level, the ideas tried in this unit are adaptable to any grade level using any area of science.

## OVERVIEW CHART FOR INTERMEDIATE GRADES.

AREAS OF GROWTH	MAJOR FIELDS	UNITS — GRADE 4.
<ol style="list-style-type: none"> <li>1. Alertness to natural environment.</li> <li>2. Broadening of interests through wider knowledge of plants, animals, and the physical world.</li> <li>3. A knowledge of the scientific method of thinking, its use and application through the gathering and weighing of evidence, and drawing of conclusions.</li> <li>4. Development of self-reliance and responsibility in meeting new environmental situations.</li> <li>5. An increase in understanding and appreciation of the beauties and wonders of the world.</li> <li>6. Sympathetic treatment of living things.</li> <li>7. Active interest in conservation and restoration of natural resources.</li> <li>8. Realization of each person's obligation to keep the world productive and beautiful.</li> </ol> <p>Attention of the teacher is called to the fact that the proper fulfillment of the above areas of growth will result in desired moral, social, intellectual, and physical development. Note breakdown of these Areas of Growth under Desired Results.</p>	<ol style="list-style-type: none"> <li>1. Biological Sciences:—           <ol style="list-style-type: none"> <li>A. Botany:—               <ol style="list-style-type: none"> <li>1. Structure of Plants.</li> <li>2. Function of Plants.</li> <li>3. Classification of Plants.</li> <li>4. Economic and Esthetic Values of Plants.</li> </ol> </li> <li>B. Zoology.               <ol style="list-style-type: none"> <li>Vertebrates and Invertebrates.                   <ol style="list-style-type: none"> <li>1. Structure.</li> </ol> </li> </ol> </li> </ol> </li> </ol>	<p>83<math>\frac{1}{3}</math>% of Total Science Time.</p> <p>Year's Work:— Plant and Animal Life of Various Familiar Communities.</p> <p>"A Community consists of all the species living in one general situation."</p> <p>Units:— A Meadow Community. A Woodlot Community. A Pond or Brook Community. A Seaside Community. A Garden Community. An Orchard Community. A Rocky Ledge Community. A Roadside Community. The Community of Our Own Backyards. The Community of the School-yard.</p> <p>Primarily Plant Study:— How Does Your Garden Grow? Know Your Trees. Christmas Greens. Spring Flowers of Woodland, Meadow, and Garden. Plant and Animal Communities. Building a School Nature Room.</p> <p>Primarily Animal Life:— Life in Pond and Streams. Spiders. Butterflies and Moths.</p>

UNITS — GRADE 5.	UNITS — GRADE 6.
75% of Total Science Time.	66 $\frac{2}{3}$ % of Total Science Time. Unit XIII. Great Scientists.
<p>Unit II. Spore Bearers.</p> <p>Unit VI. Gardens, Tame or Wild. Seeds. Fall Work in a Garden. House Plants, Plant Propagation. Spring Work with Plants, Indoor and Out. Garden, year——— Spring Flowers.</p> <p>Unit VII. Giants of the Plant World, Trees. Life Histories of a Selected Number of Tree Families, or Genera. City Planting. Reforestation—Town Forests.</p>	<p>Unit II. Marine and Fresh Water Life. Part b—Algae.</p> <p>Unit III. Plant Life—Meaning of “Conserve That Plant.” Beneficial Bacteria, Molds and Fungi. Our School Grounds—Landscaping.</p> <p>Unit VI. Junior Forest Rangers. Woodlots and Forests, Local, State, National. Work of the Forest and Park Department.</p> <p>Unit XIV. Living Out-of-Doors— “Enjoy, Not Destroy.”</p>
<p>Unit I. Spinners and Weavers.</p> <p>Unit III. Land-Water Animals.</p>	<p>Unit I. Relation of Some Common Animals to Man. A Tiny Soil Conditioner, the “Earthworm.”</p>

	MAJOR FIELDS (cont.)	UNITS—GRADE 4. (cont.)
	2. Function. 3. Classification. 4. Economic and Esthetic Values of Animals.	Common Local Mammals and Their Habits. Winter Bird Friends. Tracking Animals. Spring Awakening. Sea Life. Birds—Spring Migration, and Nesting Birds. Plant and Animal Communities. Building a School Nature Room.
	11. Physical Sciences. A. Astronomy. B. Chemistry. C. Geology. D. Meteorology. E. Physics.	12½% of Total Science Time. Primarily Rocks, Minerals, and Weather:— How Nature Breaks Up Rocks. (Found in each community.) Maintaining Our Own Weather Bureau. (How weather affects us and the plants and animals around us.)

UNITS—GRADE 5. (Continued)	UNITS —GRADE 6. (Continued)
<p>Life Histories of _____, (One or more insects from local ponds or streams.) Life Histories of frogs, salaman- ders, and toads.</p>	<p>The Place of Predators in the World.</p>
<p>Unit IV. Animals with Backbones. Respect for Reptiles. Fur Bearers. Animal Pets.</p>	<p>Unit II. Marine or Fresh Water Life— Part a. The Place of the Scavenger.</p>
<p>Unit V. Six Leggers. Grasshoppers, Crickets, Roaches, Mantis, Beetles, Aphids, Termites. Ants.</p>	<p>Unit IV. Insects. Life of the Bee. The Mosquito. Control of Pests in the Home.</p>
<p>Unit VIII. Birds. Winged Predators. Nesting Birds.</p>	<p>Unit VIII. Birds. Attracting Winter Birds. Societies for the Scientific Study of Birds. Mysteries of Migration.</p>
<p>25% of Total Time.</p> <p>Primarily Stars and Planets, Water and Rain- fall, Machines, Heat and Light, Rocks, Min- erals, Soil, and Erosion.</p>	<p>Unit XIII. Fresh Water Fish and Fishing.</p> <p>Unit XIV. Living Out-of-Doors. "Enjoy, Not Destroy."</p>
<p>Unit XI. Stars and Planets.</p>	<p>33⅓% of Total Time.</p> <p>Primarily Great Scientists, Fire, Chemistry of the Home, Electricity, Air Pressure, and Air- planes.</p>
<p>Unit IX. How Nature Manufactures Rocks.</p>	<p>Unit XII. Great Scientists.</p>
<p>Unit VI. Gardens—Tame or Wild—Soil. Erosion Problems.</p>	<p>Unit V. Chemistry in the Home.</p>
<p>Unit X. Water and Rainfall.</p>	<p>Unit XIV. Living Out-of-Doors. "Enjoy, Not Destroy."</p>
<p>Unit XII. Machines.</p>	<p>Unit XI. Airplanes.</p>
<p>Unit XIII. Heat.</p>	<p>Unit VII. Fire.</p>
<p>Unit XIV. Light.</p>	<p>Unit IX. Electricity.</p>
	<p>Unit X. Air Pressure and Devices De- pendent on Air Pressure for Their Functioning.</p>

## INTRODUCTION TO THE WORK IN GRADES 4, 5, AND 6.

Grades 4, 5 and 6 present opportunities for continuing exploration of the environment started in the Primary Grades, but the children will study various phases of the work in more detail. Interrelationships between man and his environment are stressed. Conservation and restoration aspects of the study are included. In carrying out any of the suggested units, the following general objectives should be strengthened.

### ✓ DESIRED RESULTS.

1. A knowledge of the scientific method of thinking, its use and application, through the gathering and weighing of evidence and drawing of conclusions.
2. Ability to observe details accurately and quickly.
3. Aroused interest in science.
4. The desire to ask searching questions.
5. Physical and mental alertness.
6. Ability to procure authoritative information.
7. Ability to express in simple form that which is seen.
8. Habit of verifying identifications by consulting authorities.
9. Ability to properly organize material and data.
10. Increased vocabulary.
11. Ability to work co-operatively.
12. Ability to read intelligently.
13. Accuracy in all work.
14. Ability to pursue individual interests.
15. Understanding the meaning of suspended judgment and tentative conclusions.
16. Increase in the child's understanding and appreciation of the beauties and wonders of the world.
17. Realization that many fields of exploration and adventure will repay investigation.
18. Realization of each person's obligation to keep the world productive and beautiful.
19. Realization that great discoveries and inventions come gradually through the studies, labors, and sacrifices of many people.
20. Realization that much is still unknown even to the greatest of scientists.
21. Realization that the sciences are interrelated.
22. Use of the scientific method in other fields.
23. Interest in investigating some specific branch of science.
24. Interest in the lives and works of great scientists.
25. Interest in the history of science.
26. Active interest in civic conservation projects.
27. Aroused sense of responsibility that science should be used for the benefit of humanity.



**MATERIAL BY GRADES.****GRADE 4: SUMMARY OF YEAR'S WORK.****Subject: Plant and Animal Life of Various Familiar Communities.**

A Meadow Community.

An Orchard Community.

A Woodlot Community.

A Rocky Ledge Community.

A Pond or Brook Community.

A Roadside Community.

A Seaside Community.

The Community of Our Own Backyard.

A Garden Community.

The Community of the Schoolyard.

This will be an ecological study on a child's level. A definition of "A Community" might be — "A community consists of all the species living in one general situation."

The units will not be taken in order, but will be gradually developed by topics taken at different times during the year. The probable best time to pursue each activity is suggested, but is in no way mandatory. Live materials are likely to be available at the times stated, and some activities fall naturally into certain seasons. Some form of record should be kept for each lesson. The concluding activity should draw together all parts, and organize conclusions from the summaries.

Records may take many forms; as, for example, the following:

Charts showing plants and animals found in close association in each community; large local map showing the same pictorially; diagrammatic friezes picturing the same; a series of dioramas picturing each community and its plants and animals.

It is hoped that approximately 120 minutes a week can be devoted to this work. If the program can be so arranged, it is best to have the two-hour periods together, thus allowing time for field trips. If it seems better, the two periods can be taken separately. The last period of the day is a good one as the time can be extended when necessary if a trip is scheduled.

The concluding activity will be a picnic to one or more of these communities where, through observation, facts taught during the year will be summarized.

The work in the physical sciences will be identification of the rocks and minerals found in the neighborhood or in each community, and a study of weather as it affects our lives and activities and that of the plants and animals around us.

**GRADE 4. TOPIC: HOW DID YOUR GARDEN GROW? (September)****UNDERSTANDINGS.**

1. Fall, the time of harvest, is also the time for local fairs and flower shows, for the exhibition of fruits, vegetables, specimen flowers and bouquets. New or better types of plants are often introduced here.

2. Classes of entries vary to suit the particular needs and interests of the community. The judges compare the perfection of each entry with a standard, and award points as merited. Entries are also compared with each other for special awards.

3. To be accepted for judging, plants, fruits, and flowers must be free from disease and from insect or other injury.

4. There are special sets of standards for judging each type of entry. For instance, judgment of bouquets is usually based on such points as color harmony; proportion and balance; relation of material to container; distinction or originality; and perfection of arrangement.

5. Exhibits can be designed to show what can be grown at a given season of the year.

6. Classes may include terraria or winter gardens.

**Terraria.**

1. The introduction of the terrarium is credited to Dr. Nathaniel Ward, who, when walking in the woods, noted a bottle partially filled with soil and supporting a good growth of plant life. Developing the possibilities, the Wardian Case, a glass-covered container for plants, later called a terrarium, became popular.

2. Terraria produce an outside environment in miniature. Well-planted and covered terraria need very little watering after establishment. The water cycle of evaporation and condensation takes place within the terrarium.

3. A terrarium offers a fine opportunity to display non-flowering plants; it may be used as a temporary home for animal life; a series of terraria may depict the formation of soil, rocky hillside, hillside covered with vegetation, meadow, pond.

4. A terrarium should be supplied with a layer of small gravel for drainage; a sprinkling of charcoal to keep it "sweet"; several inches of "wood earth" or rich leaf mold; small, low-growing plants in pleasing arrangement; such as small ferns, wintergreen, or violet, or non-flowering plants of the moss, lichen, or fungus groups.

5. Cover the earth between the plants with moss. Sprinkle lightly when finished and cover. If any indication of mold appears, remove cover and dry a bit. Keep out of direct sunlight.

6. Rectangular containers are more satisfactory than round ones, and can be constructed quite readily from pieces of glass cut to size and taped together with waterproof adhesive. Gallon pickle, mayonnaise, or smaller jars placed on their sides are satisfactory substitutes.

**SUGGESTED APPROACHES.**

Announcement of local fair or flower show is made.

After a frost destroys the garden flowers, the question is raised, "How can we have a garden in our classroom?"

A small terrarium is brought in by pupil or teacher.

**ACTIVITIES.**

1. Visit local Fair or Flower Show. Here suggestions for a class flower show may be obtained.

2. Plan and stage a full flower show, collectively or by committee.

a. Plan for suitable space and time.

b. Determine classes for entries: individual specimens of plants or flowers; bouquets (formal arrangements); "specials", which may include posters and charts.

c. Discuss and plan score cards for judging. Invite local florist, or garden club member, to visit and offer suggestions.

d. Announce the forthcoming show.

e. Invite florist, garden club member, or some interested school person to be one of the judges.

f. Take care to place exhibit material artistically, and to the best advantage.

3. Make a terrarium.

a. Construct terrarium.

b. Take field trip to locate materials.

c. Obtain permission from property owner and gather materials.

d. Fill terrarium, reproducing some natural environment as carefully as possible.

- e. At this time leaves of trees and shrubs might be gathered and pressed for use in conjunction with twig exhibit and discussion in March, Topic 13. Seed cases, grasses, and sedges may be gathered for winter bouquets.

#### BIBLIOGRAPHY.

Burroughs, Laura Lee. FLOWER ARRANGING. Atlanta, Ga.: The Coca Cola Co., Dept. F. B. Fisher, Adele S. FLOWER SHOWS AND HOW TO STAGE THEM. New York: Richard S. Smith National Council of State Garden Clubs. A HANDBOOK OF FLOWER SHOW JUDGING.

#### GRADE 4. TOPIC: LIFE IN POND AND STREAM.

**PART I, September and October. PART II, April. PART III, June.**

#### UNDERSTANDINGS.

1. There is great variety in the forms of life in ponds and streams.
2. There is great variety in the appearance of water animals.
3. Body structure and coloring greatly influence the way animals live, obtain food, travel about, and protect themselves.
4. All animals must have oxygen.
5. Plants are necessary for the maintenance of animal life in the pond and stream. Plants and animals are interdependent.
6. In making food, plants give off oxygen which is used by animals. In turn the animals give off carbon dioxide which the plants need in making food. The correct balance must be maintained.
7. Some animals have lungs and get their oxygen from the air, while others have gills and get their oxygen from the water.
8. Some animals spend their early life in water and breathe through gills, but in adult life they develop lungs and must get their oxygen from the air.
9. Some animals breathe through the skin; so they must stay in water or where it is always moist.
10. Most activities are related to food or self-protection.
11. Animals of the ponds and streams have many ways of protecting themselves.
12. "All life comes from life and produces its own kind of life."
13. Some forms of life are not visible without the microscope.
14. Each plant and animal has a certain function which helps maintain balanced life in the pond; if this balance is upset many forms of life die.
15. Snails, crayfish, clams, polliwogs (sometimes), and some insects are scavengers.
16. Conscientious care must be given to all animals kept in captivity.

#### SUGGESTED APPROACHES.

- I. Fall (Last of September and the first of October).
  - A turtle, frog, or water insect is brought in.
  - Dragonfly, flying over the playground or entering the classroom through the window, frightens the children because of superstition.
  - A visit is made to a Natural History Museum.
  - The children visit a large aquarium, or a small one in someone's home or at a store.
- II. Early Spring (when ice breaks on ponds, or middle to last of April).

"Spring peepers" or loud croaking of mating frogs attract attention of child.  
Frog, salamander, or toad eggs are brought in.

### III. Late Spring (Middle of June).

It is suggested that animals in captivity all winter should be returned to the pond or stream.  
The children find an article in the newspaper about work to exterminate the mosquito.

## ACTIVITIES.

### Fall.

1. Take field trips to study and collect life in and near water: brook (running), pond (still, reedy).
2. From books, pamphlets, and magazines, learn how to prepare and care for an aquarium to receive animal life. Organize, in a book or illustrated chart, all findings. Send a copy to a school near the sea in exchange for material about sea life.
3. Prepare, stock, and maintain an aquarium. Keep a pictorial diary of observations and activities of water animals in it.
4. Write a "Nature Magazine", "Nature News", booklet, or "Movie" recording observations made and work done in the field. Include facts learned, stories, articles, poems and pictures.
7. Contribute some organized material to the School Science Room or Nature Museum.
8. With the teacher, committees make weekly plans for observation. One week they find out about snails: their structure, food, how they move, how they protect themselves; different kinds of snails, whether they lay eggs or have live young; importance of snails in pond and stream and also in aquarium, meaning of scavenger. Each week or two a different animal or plant will be taken for special observation.
9. Visit pet shop or large aquarium to learn about the proper care of animals.
10. Keep a small "visiting aquarium". Put in one animal at a time. Take to other rooms giving a lecture on the exhibit and instructions on how to care for the visitors. Then leave the aquarium for a short stay, after which another animal is put into it and a similar procedure is followed.
11. Prepare large charts.
  - How different animals protect themselves.
  - What animals begin life in the pond but spend adult life on land.
  - How the various animals spend the winter.
  - How to care for the aquarium.
  - What different animals eat.
12. Find out how siphons work. Use the siphon to clean the aquarium.
13. Find the capacity of each aquarium so as not to over stock.
14. Examine a drop of water from a pond (or culture) through the microscope.
15. Raise mealy-bugs for food for water animals.

### Early Spring.

1. Trips to the pond to collect
  - Newt eggs, first to appear, just as soon as the ice is off the pond.
  - Frog eggs, second. Often find newt and frog eggs at the same time. Frog eggs larger, and the light part very marked. Newt eggs, dark part very prominent.
  - Toad eggs come last, usually a little while after frog eggs have hatched. They are laid in long strings of jelly rather than in a mass.

Note: Bring in water for an aquarium from the same pond. Collect only a small mass of eggs.

2. Watch eggs develop and hatch. Keep a daily diary of changes.

#### **Late Spring.**

1. Return all animals in the aquarium to the pond.
2. Study the animals found here in June and compare with those found in the fall.
3. Catch specimens of different animals and put in a shallow white pan. Observe structure and movements of each.
4. Observe larger animals; e.g., muskrat, turtle, bird, in or around the pond and brook and note activities.
5. Make a study of the life found in and about the pond, comparing it with life found in and about streams.

#### **BIBLIOGRAPHY.**

Basic Science Education Series. Parker — THE AQUARIUM.

Bronson, Wilfred S. POLLWIGGLE'S PROGRESS.

Catalogues or pamphlets from Biological Supply Houses; e.g., Turtox, Chicago, Ill. Ward's, Rochester, N. Y.

Cornell Rural School Leaflets

E. Laurence Palmer, Cornell University, Ithaca, N. Y.

Waterways in the Fall. Vol. 32, No. 2.

Waterways in the Spring. Vol. 33, No. 4.

The Marsh in the Spring. Vol. 26, No. 4.

Salamanders, Toads and Frogs. Vol. 40, No. 4.

Conant, Robert. REPTILES AND AMPHIBIANS OF THE NORTHEASTERN STATES, Zoological Society of Philadelphia.

Babbitt, Lewis H. THE AMPHIBIA OF CONNECTICUT. Bulletin No. 57. State Geological and Natural History Survey, Hartford, Conn.

Ditmars, R. L. THE FROG BOOK.

Gall, Mrs. Alice. WAGTAIL.

Patch, Edith M. HOLIDAY POND.

Lutz, Frank E. FIELD BOOK OF INSECTS.

Morgan, A. P. AQUARIUM BOOK FOR BOYS AND GIRLS.

FIELD BOOK OF PONDS AND STREAMS. Putnam.

School Nature League Bulletins, National Audubon Society, 1000 Fifth Avenue, New York 28, New York.

#### **GRADE 4. TOPIC: SPIDERS. (October)**

As the children visit the various communities, spiders will be noticed. Common spiders are the garden spider, jumping spider, wolf spider, crab spider, grass or funnel web spider, ballooning spider, squint-eye spider, house spider, nursery or water spider, turret spider, possibly triangle spider. These should be observed as an important part of the different communities.

Try to find out in what ways spiders are different from insects found in the same locality. Watch their activities. Note what they eat.

Watch the spider get food. How is food caught and held?

Watch a spider spin its web. Note different kinds of webs.

Find egg cocoons. These may be brought back to the classroom and observed.

Note any spiders which have no web. How do they catch their food?

Cages similar to those built for insects may be made. Spiders may be collected, observed, and records kept of the name, simple description of each, and a bit about activities. Compare with various insects kept in another cage.

Note: In Grade 5 will be found a more detailed study of spiders.

#### BIBLIOGRAPHY.

Audubon Nature Bulletin. SPIDERS AND SILK. Series 18, Bulletin No. 9, May 1948.

Comstock, Anna B. HANDBOOK OF NATURE STUDY.

Comstock, J. H. THE SPIDER BOOK. Doubleday, Doran & Co.

Cornell Rural School Leaflet. Vol. 30, No. 2, Nov. 1936.

Cornell Rural School Leaflet. Vol. 30, No. 2, Nov. 1936. SPIDERS AND THEIR KIN.

Phillips, Mary A. SPIDER WEBS AND SUNFLOWERS. D. C. Heath & Co. (Children).

#### **GRADE 4. TOPIC: BUTTERFLIES AND MOTHS. (October and May.)**

##### UNDERSTANDINGS.

1. All insects have 6 legs, 3 body parts, and 2 feelers or antennae, and usually 2 pairs of wings.
2. Butterflies and moths are insects.
3. Butterflies and moths pass through a four-stage life cycle, called a complete metamorphosis; e.g., egg, larva, pupa, and adult.
4. Caterpillars are the larval stage of butterflies and moths.
5. The six true legs of the caterpillar are located near the head. This is the second section or thorax of the adult. In back of the true legs are found the pseudopodia.
6. Caterpillars breath through spiracles located along the side of the body.
7. Caterpillars are often completely dependent upon one kind of plant for food.
8. All caterpillars are voracious eaters and if too numerous become pests. Then man must take control measures.
9. Because of eating habits and consequent rapid growth caterpillars pass through several molts.
10. The pupa of the butterfly and moth is enclosed in a chrysalis. Some chrysalises are enclosed in a silk-like covering called a cocoon. Moths usually emerge from a cocoon.
11. Butterflies always have knobbed antennae. Moths have fern or thread-like antennae but no knobs.
12. The wings of butterflies usually remain vertical when at rest. The wings of moths usually remain horizontal.
13. Butterflies are usually active during the day; moths at night.
14. Butterflies and moths may spend the winter in any one of the four stages.
15. Adult butterflies and moths eat liquids, such as nectar, but some are short lived as they have no mouth parts at this stage.
16. In taking the nectar from flowers the butterflies and moths aid in the pollination of flowers, especially the night blooming flowers.

## SUGGESTED APPROACHES.

Teacher prepares a bulletin board of colorful pictures of butterflies and moths.

Web worm nests are observed on trees near the school.

When it is time for the butterflies and moths to emerge from the cocoons and chrysalises which have been kept through the winter, take them from their winter quarters. Place them where it is warm and light. Be sure the butterflies and moths have something upon which to climb and cling when they emerge.

## ACTIVITIES.

1. Take the class outdoors in September in search of caterpillars. Be sure to collect a supply of fresh leaves from the plant on which the caterpillar is found.
2. Make insect cages.
3. Watch and record caterpillars' appearance and activities; e.g., where found, eating habits, date of pupation, pupation period, color, shape, size, markings, texture, etc.
4. Identify the caterpillars, pupas, or adults.
5. Chrysalises and cocoons must be kept in a cool place over the winter so they do not emerge too early, or dry out. They must not be subjected to severe changes in temperature, excessive dampness, or excessive dryness. They must not be handled. Continue in spring the records started in the fall.
6. Make a chart with the empty cocoons and chrysalises. Use pictures or sketches of the adults. Include the name of the plants they ate, as caterpillars.
7. Committees report on study and observation.
8. Set up a trap for catching night flying moths.

## BIBLIOGRAPHY.

- Audubon Nature Bulletin. BUTTERFLIES AND MOTHS. Series No. 18, September, 1947—No. 1 CATERPILLARS. Series No. 14, Bulletin No. 1, September, 1943, Reprint March, 1946.
- Holland, W. J. THE BUTTERFLY BOOK. New York: Doubleday.  
THE MOTH Book. New York: Doubleday.
- Moore, Clifford B. THE BOOK OF WILD PETS. New York: G. P. Putnam's Sons.
- Parker, Bertha. BUTTERFLIES. New York: Row, Peterson and Company.

## GRADE 4. TOPIC: KNOW YOUR TREES. (November.)

### UNDERSTANDINGS.

1. Trees are the largest seed-bearing plants.
2. Trees conserve moisture, prevent floods and soil erosion, and keep streams clear by supplying duff (humus) on the forest floor.
3. Through photosynthesis, trees contribute a large proportion of the supply of oxygen essential for animal respiration
4. Trees are natural sprinkler systems supplying moisture through transpiration, cooling the air in the immediate vicinity and en masse helping to prevent drought.
5. Trees provide food and shelter for many forms of life, including man, and shade for plants and animals that need a cool, moist environment.

6. Trees are a very important natural resource supplying materials such as lumber, paper pulp, rubber, tannin, turpentine, tung oil, and cellulose.

7. The whole or any part of a tree has some aspect of beauty through the seasons, symmetry or coloring of buds, leaves, flowers, seeds, or bark.

8. Trees consist of three parts:

Crown, which includes limbs, twigs, buds, flowers, seeds, and leaves, where photosynthesis occurs.

Trunk, which is a support for the crown and serves to connect crown and roots, relaying water and minerals upwards and manufactured carbohydrates downwards.

Roots, which absorb all water and minerals, and anchor the trunk and crown, while keeping the soil in place and preventing erosion.

9. All growth of trees occurs on the outer surfaces; i.e., extensions of tips of twigs and roots, and increased girth by expansion of cambium layer.

10. Specific trees are adapted to specific environments and climatic conditions.

11. Trees are classified botanically according to flower structure, into orders, families, genera, and species.

12. Trees are evergreens or deciduous.

13. The evergreen trees of Massachusetts are conifers (cone-bearers).

14. Conifers shed and replace their leaves as do the deciduous trees, but the process is less obvious, since the old leaves are retained through an entire year and are shed after the new leaves appear.

15. Deciduous trees lose their leaves to prevent loss of water and avoid winter-killing of tissue during the period when water is less available.

16. Color and form of leaves, buds, flowers, bark, and entire tree are all aids in identification.

17. Fallen leaves should be conserved to supply humus and burned only if diseased or insect ridden.

18. Many specific trees have been famous in history.

19. Forest fires are the greatest enemies of trees.

20. About ninety per cent of the forest fires in the United States are caused by carelessness.

#### SUGGESTED APPROACHES.

Reference to cutting or storing winter wood supply.

Forest fire prevention during hunting season; local or New England forest fire reports; closing of woods in dry period.

Planting of a tree by park department or citizen.

Use or burning of leaves in the vicinity.

The picture of a famous historical tree posted and captioned.

Tree seeds or seed cones brought in.

#### ACTIVITIES.

1. Take a field trip to note fall appearance of trees.

Compare deciduous and evergreen trees.

Compare several species of deciduous trees as to general form, bark, arrangement of branches, and prominence of buds. Repeat for evergreens.

Note particularly any indications of animal activity.



2. Map or chart the deciduous and evergreen trees on or near the school grounds.
3. Make a compost pile of leaves either in the school yard or at home.
4. Write to the American Forestry Association, State Conservation Department, State Extension Service, or any large company manufacturing wood products for charts and materials about trees.

5. Adopt a specific tree, either collectively as a class or individually. Identify and keep a diary of the tree. Record the following data:

Habitat. Manner of growth: sketch outline of tree.

If evergreen, note the following items.

Are the leaves in bundles, single, round, flat, soft, stiff, scale-like, long, short, sharp, blunt, lighter colored on under side, fragrant when crushed? What time of shedding?

Are the twigs rough or smooth where leaves have fallen, circled by leaves, 2-ranked (leaves growing out of 2 sides of twig), fan-like?

Are the cones little, big, long, short, upright, pendant, thick or thin scaled, fat, slender, berry-like (red cedar) though actually of cone structure?

Are the seeds at the base of the scales? What is the form of the seed? What means of travel have the seeds? (Keep a closed cone in a warm room; when cone opens, seeds should be released.)

Are the branches dead or missing on lower portion of tree, or present and living to ground level?

What is the texture, color, and smell of the bark?

What is the appearance of the flowering parts, and when do they appear in the spring?

If deciduous, note the following items.

Are the branches opposite or alternate?

Are all leaves shed or do some persist until spring?

Are buds alike or varied? What is the position, color, size, shape, and texture of the buds?

What is the number and texture of the bud scales?

What is the color, taste, and smell of the twigs? What markings, ridges, lenticels (breathing pores), leaf scars, bundle scars (on leaf scars) are on the twigs? What is the shape and color of the pith when cut diagonally?

What is the color, texture, and smell of the bark?

If present, what size, shape, and color are the seeds? What is the type of seed case? What means of travelling have they? How are they useful as food?

In spring, what is the size, shape, texture, and color of upper and under sides of leaves? What type are they (simple, or compound)? What is their venation?

In spring, what is the time of appearance (before, with, or after leaves), color, form (staminate, pistillate, or perfect) of the flowers?

Indications of animal activity.

Are there signs in or on the tree, such as insects, insect eggs, woodpecker holes, birds' nests, squirrel nests or holes, bird or mammal transient guests?

Are there signs around the base of the tree of insects, spiders, snails, mammals, salamanders?

Indications of disease, injury, fungus, or algae growth.

Amount and condition of humus under tree.

If branches are within reach, measure and record previous year's growth; otherwise, estimate it.

6. Become acquainted with stories of a few famous trees.

7. Visit burned over area to note reestablishment of plant life.

**GRADE 4. TOPIC: COMMON LOCAL MAMMALS AND THEIR HABITS**  
**(November and December)**

UNDERSTANDINGS.

1. A mammal is a warm-blooded vertebrate with hair or fur, which suckles its young.
2. Mammals live in all sorts of places.
3. On the ground may be found such mammals as cottontail rabbit, chipmunk, meadow and white-footed mouse, skunk, woodchuck, red fox, mole, weasel, deer, and raccoon.
4. In the trees may be seen the red and the gray squirrel, flying squirrel, and perhaps porcupine, or raccoon.
5. In and around ponds and streams live the beaver, otter, muskrat, and mink.
6. Some mammals hunt for their food during the day: chipmunk, gray and red squirrels, cottontail rabbit, woodchuck, red fox, and muskrat.
7. Many mammals are more active at night: bat, flying squirrel, white-footed mouse, raccoon, skunk, beaver, otter, weasel.
8. Most mammals have their young in spring.
9. Most mammals spend the summer feeding and caring for the young.
10. There is much hunting of food in autumn because some mammals store food for winter (ex. chipmunk and beaver).
11. Some mammals sleep through the winter (hibernation) after storing food as body fat (ex. woodchuck and bat).
12. Some mammals are active through the year (ex. weasel, fox, and rabbit).
13. Carnivorous, herbivorous, and insectivorous mammals are classified according to dentition (the type and arrangement of teeth).

SUGGESTED APPROACHES.

Child reports seeing mammal near school or home. Discussion develops on mammal activities and homes.

Interest may develop from text, pictures, movies, radio, television, etc.

Loan exhibits may be obtained from museums.

ACTIVITIES.

1. Take trips into fields or woods or school yard.
2. Look for mammal tracks and homes, such as squirrel nests in trees, mouse tunnels in grass, woodchuck holes, or mole tunnels under lawns or in garden.
3. Visit zoo or wild animal farm. Watch mammals eat and keep records of foods eaten by the different mammals.
4. Visit Natural History Museum.
5. Inquire at museum, or other authority, which mammals are numerous and which are scarce in the community.
6. Bring hamster into classroom. Build home, feed and water, keep pen clean, make clay foot-prints.
7. Put food out for squirrels and rabbits.
8. Collect pictures of mammals for exhibit. Read stories.
9. Make a combination scrap book and story book on the mammals found in the neighborhood. Collect pictures and interesting articles, draw pictures, and write interesting accounts.

10. Place on bulletin board articles of interest that appear in magazines and newspapers.
11. Draw colorful frieze or individual pictures depicting the local mammals.
12. Make habitat scenes of local mammals. Try to show pictorially the eating habits of each.

#### BIBLIOGRAPHY.

- Blough, Glenn O. ANIMALS THAT LIVE TOGETHER.  
ANIMALS AND THEIR YOUNG. Row, Peterson Co.
- Eifrig, C. W. G. MAMMALS.
- Harrington, Harriet A. LET'S GO OUTDOORS.
- Driver, Ernest C. NAME OF THE ANIMAL (Skull key).
- Hager, Robert. PARADE OF THE ANIMAL KINGDOM.
- Kane, Henry B. THE TALE OF THE WHITE FOOT MOUSE.
- Mason, George F. ANIMAL HOMES.  
ANIMAL TRACKS.
- Morgan, Ann. ANIMALS IN WINTER.
- Seton, Ernest Thompson. WILD ANIMALS AT HOME.
- Sneidigar, Robert. OUR SMALL NATIVE ANIMALS, THEIR HABITS AND CARE.
- Villinger, Lou. CHILDREN OF OUR WILDS.
- Moore, Clifford. THE BOOK OF WILD PETS.
- Anthony, Harold E. FIELD BOOK OF MAMMALS.  
FIELD BOOK OF MAMMALS OF N. E. STATES.

#### GRADE 4. TOPIC: CHRISTMAS GREENS. (December)

##### UNDERSTANDINGS.

1. Restraint should be practiced in the gathering and use of greens for Christmas decorations.
2. Recognition and knowledge of materials add to the joy of construction.
3. Of the "Big Four" evergreens, Balsam Fir, Spruce, Pine, and Hemlock, the first three are the most fragrant and hold their needles longest.
4. The use of scissors or a knife in the gathering of greens should be stressed to prevent possible injury to remaining stock through breaking or tearing. Material should be so gathered that there are no ugly scars left. Keep materials in water and cool between time of cutting and time of using, to reduce fire hazard.
5. Natural materials needing protection include lycopodiums (Ground or Princess Pine), laurel, partridge berry, black alder, bayberry, and native holly.
6. Natural materials which may be gathered freely include all cones, seed cases, such as milk-weed, evening primrose, speckled alder, rose hips, barberry, wild cucumber, sensitive fern spore cases, juniper, and red cedar. The seed cases are very attractive when "silvered" with aluminum paint, or gilded. Cones and seed cases are especially good as there is no loss to stock plants.
7. Often evergreen clippings may be purchased very reasonably at the Christmas tree stands or prunings acquired from local sources.
8. Directions for the construction of larger pieces such as wreathes, swags, and garlands, and their miniature counterparts, corsages, and table pieces, may be found in many magazines, in leaflets published by the State Extension Service, and in a number of books on floral arrange-

ments. "Make Your Own Merry Christmas" by Anne Wertsner, M. Barrows & Co., N.Y., has many suggestions.

9. Chemical sprays to reduce fire hazard are now available and should be used according to instructions supplied. A solution of 1 pound of Ammonium Phosphate dissolved in 10 gallons of water is a recommended spray. Christmas trees may be kept fresher and more fire resistant if kept in water. Placing a tree in a cool room in a solution of Ammonium Phosphate and water equal to  $\frac{1}{4}$  the weight of the tree until entire solution is absorbed, about 3 or 4 days, makes the tree fire-resistant. The solution should be prepared at the rate of 1 pound of chemical to  $1\frac{1}{2}$  pints of water.

10. A growing tree indoors or outdoors is more desirable than a cut one. When cut trees are used, in many cases they can be set up outside after the holidays to serve as bird feeding stations and shelters.

#### **GRADE 4. TOPIC: BIRD LIFE OF FAMILIAR COMMUNITIES. (January, April, May, June).**

##### UNDERSTANDINGS.

1. There are many different kinds of birds.
2. Birds of a family have certain common characteristics.
3. Birds vary greatly in size, color, shape of body, head, tail, wings, beak, feet, flight, song, eating, and nesting habits.
4. The bird's wings, feet, and beak help him to protect himself and to obtain food.
5. The shape of the beak usually limits the kind of food eaten.
6. Some birds eat animal food; some eat plant food; some eat both.
7. Some birds, usually the female and young, have protective coloring and markings.
8. Some birds change their color as winter comes.
9. Most birds migrate, some great distances, as the seasons change. Others are permanent residents.
10. It is a great joy to attract birds to your home.
11. Birds are of great value. None is entirely harmful.
12. It is our responsibility to help protect our birdlife.

##### SUGGESTED APPROACHES.

1. A nesting bird is discovered.
2. An illustrated lecture is given by a bird authority.
3. A visit is made to a feeding station or bird sanctuary.
4. The first spring arrivals are recorded.
5. The children listen for birds' songs. (Bird records may be used to arouse the children's interest in listening out-of-doors.)

##### ACTIVITIES.

(Note: The suggested activities have been organized around a planned class organization. Though valuable, this plan is not essential to the study of birds. Any of the activities suggested in the outline may be selected and carried on by the class.)

1. Class forms a club or organizes working groups.  
The club elects officers.  
The working groups elect leaders.

## 2. Club (or class) activities are planned.

### Trips into the field.

School day trips: first hour best; period before or after lunch may include picnic lunch; last period and after school (poorest for bird study).

### Saturday meetings.

An early morning walk concluded with breakfast, planned and prepared by the children. Saturday or school day.

### Records.

Secretary's reports.

Observations recorded: Bird Calendars, made by class.

Individual records, with observation of interest.

### Other indoor and outdoor activities.

Collections: pictures, nests (only in the fall and winter), types of food eaten by birds, bird literature.

Organization of collections so they will be of value. Plan a reference library for the whole school: posters, charts, objects, habitat groups, plans for building houses, baths, feed trays; photographs, records of observations made over a period of years, or of special studies made; music; games; bulletins; books.

Bird stations near enough to be cared for and observed by the children daily. Provide nesting materials and water.

Trip to museum and/or sanctuary. Learn about the value of birds and how to attract them.

Writing and construction activities. Write bird books; include pictures, simple descriptions of bird, habitat, and original anecdotes. Write to various sources for needed information. Write bird bulletins to be distributed to other classes. Write "human interest" stories about birds. Contribute a column on bird life to the school paper. Keep class or individual diary, including observations made and information gained. Prepare charts. Make maps. Build games. Build habitat groups (dioramas). Make electrical identification board for birds and habitats. Make pictures, friezes, panels, blackboard pictures.

Attend illustrated bird lectures.

## CULMINATION AND EVALUATION.

Sharing and evaluating the year's experiences.

Plan Club "Opening Meeting" or assembly.

## OUTLINE OF CONTENT IN STUDY OF BIRDS.

Learn to recognize and call by name the common and some of the less common birds of the neighborhood.

Birds with which children should be familiar. Selection for study depends on age level, interest, locality, season, and variable conditions from year to year.

### Herons and Bitterns

Great blue heron

Black-crowned night heron

American bittern

Green heron

### Accipiters or short-winged hawks

Sharp shinned hawk

### Geese

Canada goose

### Surface-feeding ducks

Mallard

Black duck

### Ospreys

Osprey

- Buteos, or Buzzard Hawks  
     Red-shouldered hawk  
 Harriers  
     Marsh hawk  
 Quails, Partridges, Pheasants  
     Bob-white  
     Ring-necked pheasant  
 Plovers and Turnstones  
     Killdeer  
 Terns  
     Common tern  
  
 Pigeons and Doves  
     Rock dove, Domestic pigeon  
     Mourning dove  
 Owls  
     Screech owl  
     Great horned owl  
     Snowy owl  
     Barred owl  
 Hummingbirds  
     Ruby-throated humming bird  
 Kingfishers  
     Kingfisher  
 Flycatchers  
     Kingbird  
     Crested flycatcher  
     Wood pewee  
     Least flycatcher or Chebec  
     Phoebe  
  
 Crows and Jays  
     Crow  
     Bluejay  
 Titmice  
     Black-capped chickadee  
 Creepers  
     Brown creeper  
 Thrashers and Mockingbirds  
     Brown thrasher  
     Catbird  
  
 Kinglets  
     Ruby-crowned kinglet  
     Golden-crowned kinglet  
 Waxwings  
     Cedar waxwing  
  
 Starlings  
     Starling
- Falcons  
     Sparrow hawk  
 Grouse  
     Ruffed grouse  
 Woodcock, Snipe, Sandpipers  
     Woodcock  
     Spotted sandpiper  
     Yellow-legs  
  
 Gulls  
     Great black-backed gull  
     Herring gull  
 Cuckoos  
     Yellow-billed cuckoo  
     Black-billed cuckoo  
 Goat suckers  
     Nighthawk  
     Whip-poor-Will  
 Swifts  
     Chimney swift  
 Woodpeckers  
     Downy woodpecker  
     Hairy woodpecker  
     Flicker  
     Yellow-bellied sapsucker  
     Pileated woodpecker  
 Swallows  
     Barn swallow  
     Tree swallow  
     Bank swallow  
     Eave swallow  
     Rough-winged swallow  
     Purple martin  
 Nuthatches  
     White-breasted nuthatch  
     Red-breasted nuthatch  
 Wrens  
     House wren  
 Thrushes  
     Robin  
     Bluebird  
     Wood thrush  
     Hermit thrush  
     Veery or Wilson's thrush  
     Olive-backed thrush  
 Shrikes  
     Northern shrike  
                                     (rare winter visitor)  
 Wood Warblers  
     Black and white warbler  
     Nashville warbler

## Vireos

Red-eyed vireo  
 Warbling vireo  
 Yellow-throated vireo

## Weaver Finches

English sparrow

## Meadowlarks, Blackbirds, Orioles

Meadowlark  
 Bobolink  
 Red-winged blackbird  
 Baltimore oriole  
 Grackle  
 Cowbird

## Tanagers

Scarlet tanager

## Sparrows, Grosbeaks, Finches, Buntings

Song sparrow  
 Chipping sparrow  
 Field sparrow  
 Vesper sparrow  
 Fox sparrow (migrant)  
 Swamp sparrow (not common)  
 Tree sparrow (winter)  
 White-throated sparrow  
 Junco  
 Rose-breasted grosbeak

## Parula warbler

Yellow warbler  
 Magnolia warbler  
 Myrtle warbler  
 Black-throated blue warbler  
 Black-throated green warbler  
 Blackburnian warbler (rare)  
 Chestnut-sided warbler  
 Blackpoll warbler  
 Ovenbird  
 Redstart  
 Louisiana water thrush  
 Northern water thrush  
 Palm warbler  
 Wilson's warbler  
 Canada warbler  
 Prairie warbler  
 Pine warbler  
 Evening grosbeak  
 (rare winter visitor)

## Indigo bunting

Redpoll (rare winter visitor)  
 Goldfinch  
 Purple finch  
 Pine siskin  
 (migrant and rare winter visitor)  
 Towhee or Chewink  
 Snow bunting (winter visitor)

**Observations to make:**

- a. Size—smaller than, about size of, larger than, sparrow, robin, crow.
- b. Shape—length and shape of tail, size and shape of body, long and slender, short and stubby.
- d. Distinguishing marks—throat markings, rump, cap, wing bars, spotted breast, tail feathers.
- e. Flight characteristics—steady, nervous, darting, undulating, sailing, quiet, noisy, call or sing on wing.
- f. Beak—seed eating, for cracking cones, insect eating, for digging, for boring.
- g. Where seen? In flocks? In pairs? Single?
- h. Activities during observation. Eating? What and how?
- i. Call—learn to recognize characteristic calls, danger signals.
- j. Song—learn to recognize songs of more common birds.

**Which of our birds**

Are all year round friends?  
 Come early and nest in our yards, orchards, woods?  
 Come later in the spring or early summer and nest here?  
 Are merely migrants?

**Migration.**

Why do birds migrate?

How do specialists study the migration habits of birds? Of what value is bird banding? What has been discovered? Can we help? What is our duty toward migrating birds?

### Seasons for study.

Winter study is comparatively easy because there is less foliage and fewer species.

Spring is the best season to study the birds in Massachusetts as the colors are bright, the birds are more concentrated in flocks, they sing.

In the summer they are quieter while busy raising young, and molting.

In the fall identification is difficult because most are in female or immature plumage and they sing less frequently.

### Nesting habits.

Where do the various birds nest? High in trees, low in trees, on the ground, underground; in holes in trees or in bird houses; in buildings, bridges, poles, etc.; near water, in orchards, near houses; in open woods of deciduous trees, in evergreen trees.

Of what materials are the various nests made? Note whether they plaster nests, use materials near at hand or farther afield, make nests carefully, or loosely and carelessly. Note various linings.

Which bird builds the nest—male, female, both?

What bird makes no nest at all but lays eggs in nests of smaller birds, the yellow warbler and chipping sparrow being common victims?

Which birds use the same nesting place each year?

Which birds make their own holes? Which use holes already made?

Number, color markings, and size of eggs. Is the incubating shared by both male and female? How long does it take?

What and how are the young fed?

The young birds usually leave the nest for the first time before dawn. They are often fed by the parent after they can fly.

How can we help nesting birds? Observe from a distance. Do not disturb the nest. Keep cats indoors at night and in the early morning, and feed well before letting out.

If making a collection of nests, fall is the best time of year to gather them. Why?

What do birds eat? Which birds predominantly eat seeds? Insects? Both seeds and insects? Rodents, fish, shell fish, other birds, or their eggs? Fruit and young plants?

Are birds of any economic value?

The statement has been made that if bird life were suddenly extinct man would die. Why is this possible, even probable?

Are any birds economically harmful?

Which birds are protected by law? Which are not?

What can we do to attract and protect birds?

During the winter months provide various kinds of food for the birds: fatty seeds, like sunflower, hemp, peanuts; suet, doughnuts, cake crumbs, small dried raisins, peanut butter, wild bird seed, chick feed, also other small seeds such as canary seed, millet.

Provide water in the summer and also in the winter if possible.

Provide and protect nesting places.

Plant bird-attracting shrubs and trees.

Keep cat indoors at night and early morning and feed well before letting out especially during the nesting period.

Support organizations which are striving to control pollution of water, wanton killing, cutting of forest lands and draining of ponds and swamps.

Bird sanctuaries: where located, why maintained, our responsibility toward them.



**GRADE 4. TOPIC: ROCKS AND MINERALS. (January)****UNDERSTANDINGS.**

1. Two agencies are constantly at work breaking down and building up the rock surface of this world. They are chemical and mechanical.
2. Chemical agents produce the decay of rocks. They work best in warm, moist climates, which have abundant vegetation.
3. Mechanical agents produce rock disintegration. They work best in a dry climate, in which there are temperature changes from extreme heat to cold.
4. These agents work together in most climates, one aiding the other.

**Chemical Agents of Weathering.**

1. In nature many dilute acid solutions are formed. These solutions are capable of dissolving rock.
2. An acid is usually a liquid that tastes sour, and has the power of dissolving many substances.
3. Many acids are poisonous; so there is great need of care in handling them.
4. Although some acids are found in foods, many others will produce severe burns.
5. Examples of dilute acids found in foods: citric acid gives lemon juice its sour taste; lactic acid is in sour milk; malic acid in sour apples; acetic acid in vinegar; and carbonic acid in soda water (not to be confused with carbolic acid).
6. Carbonic acid is found in nature and is capable of dissolving certain types of rocks. By this method caves are formed and rock layers of great thickness may be destroyed.
7. Many other solutions capable of eating away rocks, minerals, and metals are formed by water mixing with a variety of substances.
8. Oxygen from the air unites with many rocks to form compounds known as oxides. These compounds are usually in the form of a powder and are washed away by water. Ex., rocks containing iron often show powdered rust on their surface.
9. The copper in many rocks uniting with carbon dioxide in the air forms a green coating which is then washed away by the rain.

**Mechanical Agents of Weathering.**

1. The direct rays of the sun heat and expand rocks. After sunset the rocks cool and contract. This causes them to scale and split.
2. Water seeping into the pores and cracks of rocks freezes. The ice formed expands, splitting the rocks. The strength of water freezing is shown when brass pipes split because the water in them freezes.
3. Wind blowing sand wears away rocks (abrasive effect). This is a process used in cutting letters on monuments and tomb stones.
4. The constant falling of rain wears away rocks. Letters on tomb stones are eventually obliterated by this method.
5. The flowing of streams against rocks wears them down. Small stones carried by streams aid in the process.
6. Animals rubbing against stones wear them down.

**SUGGESTED APPROACHES.**

A child brings in a rock with a layer of rust, or a coating of green or one that is very much weathered.

A large rock is seen with a crack through the middle.  
 Pictures of limestone caves, with samples of stalactite or stalagmite are shown.  
 A "pothole" is seen.

#### ACTIVITIES.

1. Take trips to road cut, cliff, gravel pit, quarry, or any spot where evidences of weathering may be found.
  - a. Find and record as many different types of weathering as possible.
  - b. Collect small specimens showing oxidation, washing away, wearing away, breaking, or any other forms of weathering.
  - c. Photograph or sketch illustrations of each type of weathering.
  - d. Collect specimens of different kinds of rocks and minerals.
2. Organize records of trips, specimens, and pictures.
3. Collect, arrange, and label pictures for the bulletin board showing various types of weathering; e.g., limestone cave, pothole, natural monuments, rock being split by roots of a tree growing in a crack, etc.
4. Make a collection of rocks and minerals found in the neighborhood. Identify and label each, using an organized collection as a source of information.
5. Build meaning of "dilute acid".
  - a. Collect, arrange, and label acids found in foods.
  - b. Teacher demonstrates. (Children must not handle acids.)  
 Drop a bit of acid on a piece of limestone or marble.  
 Dip a piece of cotton or linen cloth in dilute acid.
  - c. Taste concentrated lemon juice or vinegar. Dilute it with water and taste again. Which would have more power to eat away hard materials?
6. Experiment.
  - a. Heat a glass and chill it suddenly, or chill the glass, and pour in boiling water
  - b. Fill a bottle with water. Tightly cork the bottle and place out of doors on a freezing day.
  - c. Rub sand, sandpaper, or a rock vigorously over a soft rock.
7. Visit a stream. Find evidences of stream wearing away rock.
  - a. Smooth rocks on the bed of the stream.
  - b. Undercutting of solid rock bank.
  - c. Potholes.
8. Study types of rock used in buildings and monuments. Note what has happened to very old monuments.

Note: Because of the types of understandings to be developed in this unit, it should be carried out in the field.

#### **GRADE 4. TOPIC: TRACKING ANIMALS. (February)**

##### UNDERSTANDINGS.

1. Many animals, especially mammals and birds, leave their prints in snow, mud, and sand.
2. Their prints tell many interesting stories. Hands, feet, claws, and tails are the "pens" that write these stories.

3. In many instances, the track is distinctive for the species and serves to identify it.
4. Learning how to recognize the tracks of our common animals adds to the pleasure of being outdoors.
5. The study of tracks often discloses something of the animal's habits, and thus adds to our knowledge of native wild life.
6. The track is frequently a clue to the behavior of the animal, as many animals have a different gait when walking, running, bounding or foraging.
7. Tracks sometimes reveal much about animal psychology. The mink will usually go right into any hole or burrow that it may come upon, whereas the weasel will first investigate or inspect the surroundings before going in.
8. The location of a track frequently helps to identify the maker. The tracks of the porcupine are usually found near trees; those of the otter, beaver, and mink near water; and those of the skunk and weasel around brush piles, straw stacks, and deserted buildings.
9. The appearance of a track is often the only clue to the animal's presence. This is particularly true of night prowlers and animals that roam abroad in the twilight of late evening and early morning.
10. In addition to prints of their feet, some mammals, such as the deer mouse, short-tailed shrew, brown rat, and muskrat, also leave a tail mark which is often a help to identification.
11. Bird tracks are common, but as they lack the individuality of mammal tracks they are more difficult to recognize.
12. The shape and size of the print and the number of toes showing, together with the gait, serve to distinguish birds' tracks. Frequently, there are semi-aids of separate marks made by the tips of wing feathers as in the print of the partridge.

#### SUGGESTED APPROACHES.

- Discuss the various habitats of animals.
- Discuss the seasonal occurrence of mammals and other animals.
- Discuss the behavior of animals and suggest how their behavior may be learned from the arrangement of their tracks.

#### ACTIVITIES.

1. After a snowfall go to the nearest field or woods and search for tracks.
2. At other times, look for tracks in dusty hollows, often under overhanging rock ledges; along the muddy bank or sandy shore of a stream or pond; and in a dusty or sandy road.
3. Go to the seashore and look for tracks in the sand.
4. Keep a record of tracks observed and identified, with the name of maker, date, location, kind of medium, variations, and other pertinent data.
5. Make drawings of tracks. Draw a track to scale.
6. Study the track for a possible clue as to the behavior of the maker; from the viewpoint of animal psychology; of anatomy.
7. Write an essay on a personal experience of tracking an animal.
8. Take photographs of tracks. Make plaster casts.
9. Make animal track stamps and with the aid of an ink pad and a large sheet of "snowy" white paper or "muddy" brown paper, stamp out the tracks of various animals.
10. Make tracks in sand in a sand table by holding the fingers of one hand or of two hands together in the proper position for the tracks of a rabbit, squirrel, or any other animal

Make the print of a skunk's hind foot by placing the fist sideways against the sand and then with the fingers arrange the toe marks.

#### BIBLIOGRAPHY.

- Brunner, J. TRACKS AND TRACKING. New York: The Macmillan Co., 1922.
- Driver, Ernest C. NAME THAT ANIMAL. pp. 513-527. Northampton: The Kraushar Press, 1942.
- Headstrom, Richard. WHOSE TRACK IS THAT? Bulletin. Boston: Massachusetts Audubon Society, January, 1950.
- ANIMAL TRACKS. A Field Guide. In preparation.
- Mason, George F. ANIMAL TRACKS. New York: William Morrow and Company, 1943.
- Nelson, E. "SMALLER NORTH AMERICAN MAMMALS." National Geographic Magazine, Volume 33, No. 5, 1918.
- Palmer, E. L. "ANIMAL TRACKS". Nature Magazine, December, 1945.
- Treat, Dorothy A. SCHOOL NATURE LEAGUE BULLETIN. Series No. 16, Bulletin No. 4. New York: National Audubon Society, 1945.

#### **GRADE 4. TOPIC: WEATHER: MAINTAINING OUR OWN WEATHER BUREAU. (February and March)**

##### UNDERSTANDINGS.

1. Climate is relatively stable while weather changes occur from day to day.
2. Our atmosphere is the home of all our weather. Weather means the state of the air or atmosphere as to cold, heat, wetness, dryness.
3. The sun is the most important factor in weather.
4. International meteorological studies are of vital importance to our health and safety.
5. The U.S. weather reports are accurate 85% of the time and are growing steadily more accurate with the invention of new instruments, and increasing skill in interpreting weather signs.
6. The U.S. weather bureau performs varied and very important services; e.g., forecasting; issuing weather maps; warning and advising farmers, fruit growers, shippers, aviators; and plotting the paths of violent storms.
7. There is real adventure in the life of a meteorologist.
8. The meteorologist must have skill in many and varied fields of science.
9. We can learn to read "weather signs" scientifically. It is both useful and interesting to learn how to observe weather conditions carefully and to interpret their meaning correctly.
10. Scientific observations and interpretations help dispel many curious superstitions.
11. Weather factors are air temperature, air moisture, air motion, and air pressure.
12. Air pressure is one of the chief factors in determining and forecasting the weather.
  - a. Air presses all around us.
  - b. When air is warmed it becomes lighter and expands, and the pressure is low. It rises when pushed by a colder mass of air.
  - c. When air is cooled it contracts. It is heavy and the pressure is high.
  - d. We measure changes in air pressure by barometers.

- e. Air moves from points of high pressure to points of low pressure.
- f. "The place on the ground where warm air meets the cold air is called the warm front. The place where the cold air is pushing into the warm air is called the cold front. An occluded front is where two cold masses join underneath the warm air and force the warm air away from the ground."

13. Wind is air in motion. Differences in the temperature of neighboring air masses determine the strength of the wind.

14. The ability of air to hold moisture is an important factor in weather changes and forecasting.

- a. The warmer the air the greater the capacity to hold moisture.
- b. Water vapor is invisible. Water evaporates from oceans, lakes, ponds, or any body of water.
- c. When warm air is cooled this vapor condenses in the form of dew, fog, and clouds.
- d. This alternate evaporation and condensation is called the "water cycle".
- e. Because of this water cycle and depending upon temperatures of the atmosphere both high up and close to the earth we have clouds, fog, mist, rain, hail, snow, sleet, dew, and frost.

15. Clouds are visible moisture in the air. Clouds have a variety of forms by which we can tell whether they are made by water particles or ice crystals, how high they are, and the probable weather they indicate. The basic cloud forms are cirrus, cumulus, stratus, and nimbus. There are many combinations of these.

16. Air masses, called cyclones, move west to east across the United States and cause weather changes. Their centers are of high or low pressure. By watching their movement, meteorologists forecast our weather.

- a. Low pressure areas are of relatively warm air, frequently are full of moisture, and usually bring unsettled or stormy weather.
- b. High pressure areas are of cooler air, and generally indicate fair and cooler weather conditions.

17. There are several delicate instruments which help the meteorologist:

Thermometer	Anemometer
Barometer	Rain or snow gauge
Weather vane	Psychrometer or hygrometer

18. To forecast weather we need to know

- a. How to read a barometer — barometric pressure, rising or falling.
- b. How to read the thermometer — temperature.
- c. Direction, how to read wind vanes, how to interpret the Beaufort Scale, wind direction, and velocity.
- d. How to interpret cloud formation — sky cover.
- e. How to use a wet-dry thermometer — relative humidity.
- f. Precipitation.

19. To be students of weather we should understand the following: air, wind, snow, sleet, frost, dew, mist, fog, rain, cloud, cyclone, tornado, hurricane, direction, degrees, velocity, precipitation.

20. There are many interesting and beautiful myths about weather, showing that weather has been a topic of concern since the earliest times.

#### SUGGESTED APPROACHES.

A question about some weather manifestation; e.g., fog, lightning, frost, hail, sleet.

Unusual weather conditions. "No school" signal because of storm.

A myth or common superstition told.

A discussion of the validity of such weather slogans as "Red in the morning, sailors take warning. Red at night, sailors' delight," or "A ring around the sun means storm."

The radio announcement that an airplane trip has been cancelled.

Plants in the garden covered some September night to protect against frost. Smudge fires built in nearby orchards. Cranberry bogs flooded.

Farmers' crops suffer because of drought, high wind, hail, and frost.

Unusual weather predicted over the radio.

#### ACTIVITIES.

1. Write

U. S. Weather Bureau, Washington, D. C., for material on the study of weather.

Airline companies concerning the collection of weather information and the issuing of storm warnings.

Request for weather maps from nearest office of the U. S. Weather Bureau.

2. Study in all available sources and discuss in class

Weather Changes. Causes. Observation.

Air. What it is. Wind, direction, force, effects.

Clouds. What is a cloud? How formed? Kinds and names?

Temperature and its effect on weather.

Precipitation. Weather vocabulary. Instruments.

Severe storms; e.g., hurricane, tornado, electrical storm.

Weather reports and storm warnings. Work of U. S. Weather Bureau.

3. Set up a "Weather Bureau" and become a center for weather information for the school.

Make barometers. Study how to adjust to sea level, to read, to interpret; e.g., meaning of air pressure and rising and falling barometer.

Prepare a wet-bulb thermometer. Study how to read the thermometer, find wet-bulb depression, interpret relative humidity.

Prepare the following charts and learn to use them

Beaufort scale. Relative humidity. Cloud forms.

Study cloud forms and their meanings. Draw the most common types.

Study direction and learn to read wind names.

Note: Wind vanes may be made, but these are difficult to make and mount so as to give an accurate reading. Note smoke drift, or direction a flag is blowing. Give a child or committee the responsibility of reporting wind direction from a vane near home.

Make a chart, recording the following twice a day:

Barometric pressure.

Temperature.

Relative humidity.

Wind direction.

Wind velocity.

Sky cover.

Precipitation.

Own forecast.

Official report.

Actual weather.

Observers.

Make regular weather flags and raise twice daily after observations and predictions have been made.

4. Experiment with air and water to show  
Air has pressure. Air is everywhere. Warm air expands.  
Air currents are caused by the uneven heating of the air.  
Saturated air retards evaporation. (High humidity).  
Water changes form by evaporation, condensation, freezing.  
How clouds form. How rain is made. Finding dew point.
5. Keep temperature graphs. Note seasonal drop as well as relation of temperature to high and low air pressure.
6. Compile individual booklets. Include records of observations, articles, official weather reports, pictures, graphs.
7. Set up a Science Question Box. At intervals put questions on the board concerning any phase of the study of weather. Tell where the answers may be found. Children put their answers in the Question Box. Correct answers are recognized on a chart.
8. Read myths, legends, and poems about the weather.
9. Find superstitions about weather. Which ones have scientific basis?
10. Study about international activities in connection with weather observations and records.

#### BIBLIOGRAPHY.

- Beeler and Branley. EXPERIMENTS IN SCIENCE. New York: Thomas Y. Crowell Co.
- Brem, Peter. SCIENCE EXPERIMENTS FOR CHILDREN. Milwaukee, Wisconsin: Kenyon Press.
- Craig. SCIENCE FOR ELEMENTARY SCHOOL TEACHERS. Boston: Ginn and Co.
- Evens, Ray, Jr., and Klien, Alfred M. SCIENCE IS IN THE AIR. New York: Street and Smith.
- Humphreys, W. J. WAYS OF THE WEATHER. Lancaster, Pa.; Jaques Catell Press.
- Pickwell, Gayle. WEATHER. Los Angeles, Cal.: Hugh Newman Co.
- Vetter, Ernest. VISIBILITY UNLIMITED. New York: William Morrow and Co.
- Williams. WEATHER HANDBOOK. New York: Girl Scout National Association, 155 East 44th Street, New York 17.
- "Kenyon Forecaster". New York: Kenyon Instrument Co.
- School Nature League Bulletin — National Audubon Society, 1000 Fifth Avenue, New York 28, New York.

#### **Grade 4. Topic: SPRING AWAKENING OF ANIMALS. (March)**

##### UNDERSTANDINGS.

1. Some animals change activities and appearance with coming of spring.
2. Some animals migrate to new homes. Some visit us on their way.
3. Many animals come out of hibernation.
4. Many animals start building nests and other type homes.
5. Many water insects change to adult stage and live in the air.
6. Many land insects change to adult stage.
7. Many animals use plants for both food and shelter.

## SUGGESTED APPROACHES.

Signs of spring are noted.

An illustrated list of spring birds is posted.

Frog, toad, salamander eggs, water insect larvae, cocoons and chrysalids are brought in.

Spider webs are noticed around the building.

## ACTIVITIES.

1. Make field trips to observe spring awakening in various types of communities.
2. Keep a calendar for birds as they return from the south.
3. Make a terrarium and keep a few cocoons and chrysalids in it to watch development.
4. Make plaster casts of animal tracks coming out of hibernation.
5. Watch development of salamander, frog, and toad eggs in the aquarium.
6. Make posters — "Prevent Forest Fires", to help safeguard young animals.
7. Watch a spider make her web. Look for several types of webs.
8. Write stories about the activities of animals in the spring.
9. Collect different types of galls. Learn about insect homes, and animal and plant relationships.
10. Watch for alewife runs.

- BIBLIOGRAPHY. Basic Education Series. New York: Row, Peterson & Co.
- |                  |                         |
|------------------|-------------------------|
| ANIMALS WE KNOW. | ANIMAL TRAVELS.         |
| BIRDS.           | INSECTS AND THEIR WAYS. |
| FISHES.          | REPTILES.               |
| SPIDERS.         | TOADS AND FROGS.        |
- Boulton. TRAVELING WITH BIRDS. New York: M. A. Donahue Co.
- Burgess, Thornton. BEDTIME STORY BOOKS. Boston: Little, Brown & Co., 1947.
- Curtis. FROM ROBIN TO JUNCO. New York: Houghton Mifflin Co.
- Fabre, J. Henri. INSECT ADVENTURES. New York: Dodd Mead Co.
- Fenton. ALONG NATURE'S HIGHWAY. New York: John Day Co.
- Hylander. OUT OF DOORS IN SPRING. New York: Macmillan Co.
- Lippincott, J. CHISEL TOOTH THE BEAVER. Philadelphia: J. B. Lippincott Co.
- ANIMAL NEIGHBORS OF THE COUNTRYSIDE. Philadelphia: J. B. Lippincott Co.
- Mason. ANIMAL TRACKS. New York: William Morrow & Co.
- Morse. CREEPERS AND SLIDERS. Rockville Center, L. I.: Acorn Publishing Co.
- Stephenson. WORLD OF ANIMALS. Rockville Center, L. I.: Acorn Publishing Co.
- BEES AND ANTS. Columbus, Ohio: American Education Press.
- HIBERNATION AND MIGRATION. Columbus, Ohio: American Education Press.

## FILMS.

ANIMALS OF THE WOODS.	1 reel — sound	Encyclopedia Britannica Films.
THE HONEY BEE.	1 reel — sound.	“ “ “
THE FROG.	1 reel — sound.	“ “ “
GRAY SQUIRREL.	1 reel — sound.	“ “ “
ROBIN REDBREAST.	1 reel — sound.	“ “ “
FROGS, TOADS, AND SALAMANDERS.	1 reel — sound.	“ “ “



#### GRADE 4. TOPIC: WINTER ASPECTS AND SPRING DEVELOPMENT OF WOODY PLANTS. (March)

##### UNDERSTANDINGS.

1. Trees and shrubs are woody plants.
2. Trees normally have a single main trunk and usually attain a greater height than shrubs. Shrubs have multiple trunks.
3. Some shrubs are evergreen though not conifers; such as laurel, rhododendron, and box.
4. Many berry-bearing shrubs are important food sources for birds; such as barberry, bayberry, viburnums, sumac.
5. Poison ivy and poison sumac, both white berried and both in the Rhus genera, are poisonous to handle. If exposed to them on field trips, washing thoroughly with soap (preferably a naphtha soap) may prevent infection.
6. "Twigs" are technically the previous season's growth. A study of twigs is important in winter identification.
7. Buds developing in the spring were fully formed in the late summer or early fall of previous year.
8. Bud scales prevent winter drying of buds.
9. Bud scales are varied in position, shape, number and texture.
10. "Fuzzy" bud scales are no warmer than smooth, since no warmth is present to be retained.
11. Flower buds generally will be "fatter" than leaf buds and may be terminal or lateral.
12. Branches of trees and many shrubs may be cut in the spring for early forcing indoors of leaves or flowers. Among them are pussy willow, red maple, forsythia, flowering dogwood, barberry, wild apple, alders, birches, hobble bush, and horse chestnut.
13. Shrubs are essential for cover and protection of many birds and small mammals.

##### SUGGESTED APPROACHES.

- An early pussy willow (or other single shrub branch) is brought in for forcing.  
A bird is seen feeding on winter berries.  
Buds are seen becoming active or "swelling".  
Spring development is noticed in tree adopted in "Know Your Trees."

##### ACTIVITIES.

1. Observe buds and their activity, including adopted tree.
2. Gather several of the specimens recommended for forcing. Compare and note length of time required for appearance of flowers or leaves.
3. Gather twigs of several species, including adopted tree. Identify by use of winter bud key. If weather is warm enough, identify in the field.
4. Using above material, set up an exhibit of twigs, emphasizing opposite and alternate bud arrangement; terminal or lateral flower buds; comparison of piths as exposed by diagonal cutting of stems.
5. Start records of bud development around school grounds, a calendar, chart, or a series of sketches.

6. Take a trip to look specifically for signs of animal activity on or around shrubs, noting disappearance of berries present earlier (eaten by wild life), girdling of bark, signs of animal runs or insect homes.

#### BIBLIOGRAPHY.

Blakeslee, A. F., and Jarvis, C. D. *TREES IN WINTER*. New York: Macmillan, 1926.  
 Muenscher, W. C. *KEYS TO WOODY PLANTS*. Ithaca, New York: Comstock Publishing Co.  
 See also Nature League Bulletins and Canadian Nature for Nov.-Dec., 1949.

#### **Grade 4. Topic: SEA LIFE. (April)**

##### UNDERSTANDINGS.

1. Many different kinds of animals and plants live along the seashore. Some live on and around the rocks. Some live on sandy or muddy shores.

2. The ocean is salty. Animals and plants which live in the ocean could not live in fresh water.

3. Tides change the level of the water along the shore every few hours. Many seashore animals and plants live between the high-tide mark and the low-tide mark.

4. Seashore animals and plants are adapted for living and breathing in the water. Some are able to live part of the time out of water.

5. Tides and waves help make the ocean's edge a good place to live because they bring food and air to the animals and plants which live there.

6. Most of the plants found at the seashore are seaweeds or algae. Some algae are green, some are brown, and some are red.

7. Only plants can make their own food. In the sea, as on land, all animals depend directly or indirectly on plants for food. Much of the food in the ocean is made by millions of microscopic seaweeds.

8. Most of the animals found at the seashore are animals without backbones. Many of these are alike in some ways and are related to one another.

9. Fish are animals with backbones. Contrary to their names, starfish and jellyfish are not fish.

10. Most fish and many other sea animals and plants are not found along the shore but live off shore in deeper water.

11. Some seashore animals move about in search of food. Others stay in one place and wait for the water to bring food to them. Those that move about have different methods of moving.

12. Most seashore animals have hard shells, or spines, which protect them from their enemies and the pounding of the waves. Some protect themselves by hiding among the rocks and in the sand or the shells of other animals.

13. Most seashore animals lay many eggs, and they do not take care of their young. The young are usually very small, free-swimming, and different from the adults.

14. Some birds live along the seashore because they find their food there.

15. Many salt-water animals and a few plants are used by man for food.

##### SUGGESTED APPROACHES.

Specimens or pictures of marine life are brought in.

Specimens of sea life are seen on a visit to a museum.

Observation of the aquarium leads to a discussion of how salt water life differs from fresh water life.

A walk is taken along the shore.

## ACTIVITIES.

### A. An Outdoor Seashore Trip.

(Preferable for classes living close enough to the ocean to make this possible.) Visit the ocean at low tide. If possible, include rocky areas and sandy and muddy shores in your trip.

1. Notice where the water was at high tide and where it is at low tide. What causes tides? In what ways do tides make it hard for animals and plants along the shore? In what ways do tides help them?

2. Look in tide pools, on rocks, on the beach, and in shallow water for seaweeds. Find samples of the three common groups of algae. These are green algae (sea lettuce and others), brown algae (rock weeds, kelps, Irish moss), and red algae (many with delicate and beautiful forms.)

3. Study the many animals found at low tide attached to the rocks and living in tide pools. Look for small fish stranded in tide pools, barnacles attached to the rocks, periwinkles and other snails, mussels, rock crabs hiding in rock crevices, hermit crabs inhabiting old snail shells, small crustaceans among the seaweed, starfish, sea urchins, sea anemones, jellyfish, sea worms, and other simple animals such as sponges and sea pork. Try to determine by observation how these animals are adapted to life at the ocean's edge, what they eat, how they obtain food, how they are protected from enemies, and how they move about.

4. Explore a sandy beach looking for shells, plants, and animals left on the shore by tides and waves. Most of these will be dead and water-worn and will include shells of different kinds of snails and clams, starfish, shells of sea urchins and sand dollars, parts of crabs and lobsters, jellyfish, pieces of sponge and other simple animals, egg cases of snails and of the skate, bones of fish and birds, feathers, seaweeds, and drift wood. Most of the live animals will be found underneath the surface of the sand at the water's edge. Bubbles and opening in the sand mark the presence of small crustaceans, worms, and mollusks. Why is the beach a poor place for plants to grow? Find some plants that do grow in the sand and see how they are adapted for growing there.

5. Look for animal life on exposed mud flats. Many kinds may be found living in the mud or on and among the eel grass or marsh grass. Horse-shoe crabs and fiddler crabs, with their burrows may be found, as well as hermit crabs, spider crabs, and edible crabs. Look for the holes that mark the burrows of clams and try digging for one. How do clams burrow so fast? What do clams eat? Find the burrows of marine worms and watch them swim in shallow water. Some of them are very beautiful and graceful.

6. Watch birds along the shore. Why do sandpipers follow the edge of the waves? How are they adapted for their way of life? What do the shore birds find to eat on the mud flats? Watch seagulls break shellfish by dropping them on the rocks. Watch gulls and terns dive for fish and observe their graceful flight.

7. Collect specimens to take back to school. It is almost impossible to keep marine life alive without a constant supply of fresh seawater and special aerating equipment, so limit your collection to shells, dead specimens, and specimens that can be easily dried. Sea weeds may be carried back in water and mounted on heavy drawing paper. To mount, place paper in bottom of shallow pan filled with water. Rinse specimen until clean and then float in water above paper. Lift paper out of water slowly, arranging seaweed on it and letting it stick. Cover seaweed with cotton cloth or cheese cloth, place mount between blotters, and press until dry, changing blotters every day at first.

8. Use specimens collected to prepare an exhibit showing animals and plants of a sea-shore community.
9. Find in books more about the habits and life histories of some of your specimens and about some of their relatives which were not seen on the trip.
10. Arrange to send some of your specimens to an inland class which could not make a trip to the seashore in exchange for materials on inland waters.
11. Exchange shell collections for collections from a school on the West Coast or the Florida coast.

### **B. An Indoor Seashore Trip.**

1. Have children bring in shells or other specimens of marine life which they may have at home. Collect specimens from any other possible sources.
2. Arrange to have a class living near the seashore send you specimens of marine life which they have collected.
3. Collect pictures of ocean scenes and sea life.
4. Have an indoor seashore day. Arrange a sand table to represent a sea beach or a tide pool along the New England shore. Put in the appropriate specimens. Have books, pictures, and specimens of other marine life displayed around the room.
5. Discuss the habits and life histories of the more common seashore animals brought in. What do they eat? How do they move? How do they grow? How are they protected from their enemies?
6. Obtain a film of these animals alive.
7. Discuss tides and waves and how they influence life along the shore.
8. Have children tell about their experiences at the seashore.
9. Discuss ways in which the ocean and ocean life are important to people living inland; i. e., rain and weather, food, medicines, etc.

### **BIBLIOGRAPHY.**

- Arnold, Augusta Foote. SEA-BEACH AT EBB-TIDE. New York: D. Appleton-Century Company, Inc., 1935. (Out of print).
- Burgess, Thornton W. THE BURGESS SEASHORE BOOK FOR CHILDREN. Boston: Little, Brown and Co., 1931.
- Buchsbaum, Ralph. ANIMALS WITHOUT BACKBONES. Chicago, Ill.: University of Chicago Press, 1936.
- Crowder, William. BETWEEN THE TIDES. New York: Dodd, Mead & Company, 1931.
- Hausman, Leon A. BEGINNER'S GUIDE TO SEASHORE LIFE. New York: G. P. Putnam's Sons, 1949.
- Morris, Percy A. WHAT SHELL IS THAT? New York: D. Appleton-Century Company, Inc., 1939.
- A FIELD GUIDE TO THE SHELLS. Boston: Houghton Mifflin Company, 1947.
- Parker, Bertha M., and McCosh, Gladys K. ANIMALS OF THE SEASHORE. (Basic Science Education Series — Intermediate). Evanston, Ill.: Row, Peterson and Company, 1942.
- Verrill, A. Hyatt. STRANGE SEA SHELLS AND THEIR STORIES. Clinton, Mass.: Colonial Press, 1936.

**GRADE 4. TOPIC: SPRING FLOWERS OF WOODLAND, MEADOW AND GARDEN**  
(May, June)

UNDERSTANDINGS.

1. Flowering plants have both varied and very specialized needs as to soil types, moisture, and shade. Certain species, such as bog plants, will often be found in close association in a very limited range, while other more adaptable types will be found in a variety of habitats.
2. The earliest blooms will be found in moist locations as the water warms faster than the earth. Most of the earliest blooming flowers are perennials and many of these are bulb plants.
3. Some very small annual plants will be among the early bloomers. Bluets are a good example.
4. Before picking any flower note whether the entire plant will be destroyed by removing the bloom, as in trilliums, fringed polygala, dwarf cornel. Leave these untouched, except for a possible specimen flower for study.
5. Before picking a flower, look for at least nine more blooms of the same kind in sight.
6. Some flowers need complete protection. See list of the New England Wild Flower Preservation Society.
7. Some blossoms of all annual plants must be left to develop seed for next year's plants.
8. Many of the cultivated and some of the wild annuals may be picked freely as the plants will continue to produce blossoms until seed setting is finally accomplished.
9. Perennial flowers have a limited blooming season. Cutting their blooms will not prolong this season and usually will not affect the following year's flowering.
10. Learn the scientific names of plants for accurate reference. Know also the poetic, legendary, or particularly descriptive common name.
11. Many flowers are most beautiful in their natural setting. Enjoy them there!

SUGGESTED APPROACHES.

- Spring flowers are observed and reported.
- Bulbs bloom in public parks or gardens and are reported.
- Flower guides are put on the reading table.
- Flowers for Memorial Day are discussed.

ACTIVITIES.

1. Take a field trip to different habitats and notice particularly the number of species in bloom in each.
2. Where there are plants enough, collect carefully selected specimens for pressing and mounting for the school collection, and some for further study and to share with others at school as specimen exhibits.
3. Start calendars of blooming dates of both wild and garden flowers.
4. Study Wild Flower Preservation Society charts of plants. Then make your own charts of flowers in your community by cutouts or sketches, and indicate need of protection. (Posters might be bordered green, yellow, or red, indicating pick freely, sparingly, or not at all).
5. Make country scene on blackboard, showing woodland, field, and marshland; add flowers in proper habitat as found.
6. Look for spring legends in story books.
7. Prepare parade of spring flowers, using pictures and/or specimens in order of appearance.

## BIBLIOGRAPHY.

Mathews, F. Schuyler. FIELD BOOK OF AMERICAN WILD FLOWERS. New York: G. P. Putnam's Sons, 1929.

McKenny, Margaret, and Johnston, Edith F. A BOOK OF GARDEN FLOWERS. New York: The Macmillan Co., 1941.

---

\_\_\_\_\_ A BOOK OF WILD FLOWERS. New York: The Macmillan Co., 1939.

Muenschler, W. C. KEYS TO SPRING FLOWERS. Ithaca, New York: Comstock Publishing Co.

Parsons, Mrs. Frances S. Dana. HOW TO KNOW THE WILD FLOWERS. New York: Charles Scribner's Sons, 1900.

Wherry, E. T. WILD FLOWER GUIDE. Garden City, New York: Doubleday Co., 1948.

**GRADE 4. TOPIC: BUILDING A SCIENCE ROOM.**

## UNDERSTANDINGS.

1. Careful planning in any activity saves time, cost, and material.
2. Life in this world is well balanced and there is an interdependence of plants and animals.
3. Living things are best adapted for the environment in which they are found; and temporary homes must be as much like their natural homes as possible.
4. Man brings harm to himself when he destroys living things without knowing the scientific facts about them.
5. A science room can be made a valuable center of information for the entire school.

## SUGGESTED APPROACHES.

Take a trip to the Natural History Museum.

A desire to share things already made suggests a room in which to display them.

Booklets or pamphlets and pictures prepared during the year need a central place where they will be available for use by the entire school.

A natural pond life aquarium built earlier in the year is to be shown.

## ACTIVITIES.

1. Extensive reading to find information.
2. Making of murals, friezes, slides, and pictures illustrating science activities.
3. Building of terraria, aquaria (balanced), habitat groups.
4. Building of an insect orchestra.
5. Building a library of books and pictures. Making scrapbooks.
6. Making an indexed clipping and picture file.
7. Arranging and labeling of exhibits, and bulletin boards.
8. Making booklets in which the knowledge gathered by committees is organized and illustrated.
9. Making charts; e.g., one showing the usefulness of a certain plant or animal
10. Organizing collections; e.g., old birds' nests, galls, shells, and minerals.
11. Mounting and arranging specimens. Caring for live animals and plants.

12. Collecting names of nature poems, songs, and stories, and where to find them.
13. Compiling the names and works of some scientists.
14. Making a picture map showing the life zones of plants and animals.
15. Making a "peep box", depicting a natural history scene.
16. Writing original nature poems, stories, and articles.
17. Making and keeping alive a "Can you name this" shelf.
18. Making cages and other suitable homes for pets.
19. Making and operating a school weather station.
20. Helping other rooms with their science questions and making material available to them. Explaining exhibits to visitors.
21. Drawing plans of the science room as we wish to have it arranged.
22. Making leaf prints: spatter, carbon, crayon, photographic, blue prints.
23. Experimenting with seeds, cuttings, and roots. Growing ferns from spores.
24. Keeping a diary. Keeping a Nature Calendar.

#### **GRADE 4. TOPIC: PLANT AND ANIMAL COMMUNITIES. (June)**

As a finale for the year's science program, a picnic or field trip should be planned to visit and observe the plant and animal inhabitants and relationships in one or more natural communities, such as road side, field, rocky ledge, pond, or forest.

A typical inventory of a somewhat dry, sandy, roadside community could easily show the common association of such wild flowers as asters, golden-rods, pepper grass, plantain, chicory, burdocks, and a few grasses, with an insect population of ants, crickets, and grasshoppers predominating, and a possible garter snake, toad, insectivorous bird, or mouse to represent the vertebrates.

These observations should show that the inter-relations of plant and animal life are dependent on food and water supply available to plants, thence to herbivorous and carnivorous animals.

#### **GRADE 5. SUMMARY OF YEAR'S WORK.**

In the biological sciences, Grade 5 will continue study for the purpose of identification, with more detailed study of a selected number of plants and animals in each group. Grade 5 will be introduced to the principles of taxonomy in a very elementary way. They will be shown that living things are grouped or classified according to structural characteristics or common habits.

In the physical sciences, Grade 5 will study soil, water, and rainfall as they affect living things, and especially how one considers these factors when planning a garden or landscaping. They will be introduced to the earth's place in the solar system. Some of the stars, planets, and simpler constellations will be identified. Machines, heat, and light are considered.

Some of the units will be completed in one or two two-hour periods, others will be carried through the year, by means of a series of topics or activities.

Units complete in one or two consecutive periods:

- |                                      |                        |
|--------------------------------------|------------------------|
| I. Spinners and Weavers.             | XI. Stars and Planets. |
| II. Spore Bearers.                   | XII. Machines.         |
| VIII. How Nature Manufactures Rocks. | XIII. Heat.            |
| X. Water and Rainfall.               | XIV. Light.            |

Units comprised of a series of topics taken at different intervals during the year:

III. Land-Water Animals.

VI. Gardens—Tame or Wild.

IV. Animals with Backbones.

VII. Trees.

V. Six-Leggers.

IX. Birds.

**GRADE 5. UNIT I: SPINNERS AND WEAVERS. (September)**

**TOPIC: SPIDERS AND THEIR ALLIES—FRIENDS, NOT ENEMIES.**

UNDERSTANDINGS.

1. Spiders are not insects.
2. There are many kinds of spiders.
3. Spiders differ from insects in having a two part body, eight legs, spinnerets and no feelers.
4. All spiders hatch in the adult form from eggs. There is no metamorphosis.
5. Many spiders catch their food in webs. There are several different types of webs.
6. Some spiders catch their food in a trap; e.g., the trap door spider.
7. Spiders help us by catching harmful insects.
8. There is only one dangerous spider native to the United States—the black widow.
9. Spiders are the only true spinners.
10. The spider's silk is strong and useful.
11. Spiders use their silk in a variety of ways.

SUGGESTED APPROACHES.

Read the poem—"King Bruce and the Spider"—on the theme of perseverance.

Display pictures of different kinds of spiders and their webs.

Discuss any interesting experiences with spiders.

ACTIVITIES.

1. Collect and identify different kinds of live spiders.
2. List the common kinds of spiders in the neighborhood.
3. Collect insects and spiders; compare, noting similarities and differences. Make a parallel chart to show the differences.
4. Put a spider in a cage or milk bottle and watch it spin its web.
5. Introduce insects into the cage and observe activities.
6. Make a picture of the black widow showing the identifying mark, the red hour glass on the underside.
7. Take a trip to find the different kinds of webs and study their construction. Gently touch the web at various points and watch the resulting activity.
8. Make drawings of the webs.
9. List or illustrate the ways a spider uses his silk.
10. Find the ways the spider's silk is used by man.

BIBLIOGRAPHY.

- Audubon Nature Bulletin. SPIDERS AND SILK. Series 18, Bulletin No. 9.  
 Comstock, John H. THE SPIDER BOOK. Doubleday Doran Co.  
 Cornell Rural Leaf Booklet. Vol. 30, No. 2, Nov. 1936.



**GRADE 5. UNIT II: SPORE BEARERS.****TOPIC: FUNGI AND LICHENS, LIVERWORTS AND MOSSES. (September)****UNDERSTANDINGS AND CONTENT.**

1. The basic division in the plant world is based on the presence or absence of flowers and seeds.
2. The lowest forms of plant life, called the "Thallophytes", include the Algae, Bacteria, Fungi, and Lichens. (Algae and Bacteria are discussed in Grade 6 units.)
3. Thallophytes or Thallus Plants are plants which have no true roots, stems, or leaves.
4. Some of the Thallophytes reproduce by division or other vegetative means, many are spore bearing, none are seed bearing.
5. Spore bearing plants are flowerless and existed long before seed bearing plants.
6. Spores are the forerunners of seeds, being the reproductive portion of many primitive plants. They are minute in size, single celled, very numerous, air-borne, and ever present.
7. Some spore bearers may also reproduce vegetatively as by budding.
8. Spore bearers in general require a moist environment.

**Fungi.**

1. Fungi, lacking chlorophyll, are incapable of producing their own food, so are dependent plants gaining their nourishment from living or dead plant or animal tissue, parasitic on living tissue, saprophytic on dead tissue.
2. Fungi include yeasts, molds, slime molds, mushrooms, and rusts.
3. Yeasts are single celled plants.
4. Mold and mushroom plants are composed of two parts:
  - a. Mycelium, a net work of thread like tissue, serving all functions of the plant except reproduction.
  - b. Spore cases and spores, the reproductive portion.
5. Bracket fungi and mushrooms are common wherever there is an adequate supply of dead plant tissue and moisture. (See Grade 6 units.)

**Lichens.**

1. Lichens are the pioneer land plants, many types being able to grow on dry, bare rocks. These are important in the early formation of soil and humus. Other types grow on the earth or on living or dead plant tissue.
2. Lichens are a combination of an alga and a fungus growing together, being mutually beneficial, symbiosis.
  - a. The alga, having chlorophyll, manufactures food for the fungus.
  - b. The fungus anchors the alga, stores water, and secretes an acid which makes minerals available to the alga.
  - c. Lichens are chiefly grey green in color, though other colors exist.
  - d. Lichens are spore bearing.
3. Lichens are very sensitive to impurities in the air from which they absorb water directly, so are not found too readily in cities.
4. Lichens can survive very low temperatures and are therefore found on mountain tops and in the far north where other plants are lacking.
5. There are some ten thousand species of lichens occurring in varied habitats and falling into three main groups in general appearance.

- a. Crustose, those which have a crust like form, adhering closely to their support; ex., Fly Dot.
  - b. Foliose, those attached in part but having free edges; ex., Rock Tripe (*Umbilicaria*).
  - c. Fruticose, those having a coral-like or moss-like growth (mistakenly called mosses); ex., Reindeer Moss (*Claydonia*), or Old Man's Beard (*Usnea*).
6. A very few species are used for food by animals or man, notably the "Manna" (*Lecanora*) of the Israelites, Iceland Moss, Reindeer Moss, and Rock Tripe.
  7. The litmus solution used in chemical laboratories is made from lichens.
  8. In olden times may were used medicinally.

### **Liverworts and Mosses.**

1. In plant development the next group higher than the Thallophytes is the group called Bryophytes, consisting of the Liverworts and Mosses.
2. The liverworts may be considered the Amphibians of the plant world, as they were probably the first successful land plants. They require a very moist, generally shady environment, near fresh water.
3. They are small ribbon-like plants, composed of several layers of cells. The upper layer forms a waterproof skin, reducing evaporation.
4. Reproduction takes place in several ways:
  - a. In growth the plant forks and reorks, the oldest portions dying, leaving individual young plants.
  - b. Little cups may appear on the plants, containing buds.
  - c. Umbrella-like growths may occur, called gametophytes, producing sperm and egg cells which unite to form a colorless, parasitic plant, known as the sporophyte generation, which in turn produces another gametophyte liverwort.
5. The mosses are probably a development from the liverworts.
6. The Scale-Mosses are the first plants to show any leaf-like structure. The structure of these plants should be observed under a hand lens.
7. The true mosses have a primitive stem and leaves but lack true roots.
8. There are many kinds of mosses found in a number of habitats, on rocks, in swamp areas, and in practically all shady places.
9. They are important in soil building and in preventing soil erosion.
10. As in the liverworts, the gametophyte generation is the conspicuous one.
11. Reproduction may be by means of spores or asexually by the growth of new plants along the horizontal stems. Spore cases, called capsules, grow on little stalks, and when mature release quantities of powder-like spores.
12. Moss plants are usually only a few inches high and grow in dense mats.
13. Peat or Swamp Moss (*Sphagnum*) has had a variety of uses from surgical dressings to mattress filling and house insulation. In Ireland and Scotland it is dried, cut into bricks, and used for fuel. In this country it is used in a number of ways by florists.
14. Several types of plants are mistakenly called mosses; such as lichens, algae, and the club mosses, which are fern relatives.
15. Mosses and lichens may be collected at any time, permitted to dry, and be restored to normal appearance by moistening.

### **SUGGESTED APPROACHES.**

After a rain a mushroom plant is noticed.

A piece of dead wood with mushroom, bracket fungus, or lichen growth is shown.

A terrarium with spore bearing plants is exhibited.  
Reference is made to green growth on north side of trees.

#### ACTIVITIES.

1. Examine the school building and grounds thoroughly to discover growths of fungi, lichens, or mosses. Map findings.
2. Go to the nearest body of fresh water to search for spore bearers.
3. Examine the bases of tree trunks. Note discoveries.
4. Examine any north slopes, rock ledges, and shady places, especially in the woods, for Thallophytes. (Note: A rock ledge will often illustrate the succession and development of plant life from lichens to seed bearing trees.)
5. Scrape some crustose lichens from rock support and examine effect of lichen growth on rock surface.
6. Look for mycelium under the bark of dead trees.
7. Hunt for liverworts along the rocks and in crevices on the edges of a reservoir, dam site, or shady ravine.
8. Make terrarium featuring spore bearers. (See Grade 4, Topic: How Did Your Garden Grow? (Sept.) for instructions.)
9. Make, organize, and label separate collections of the different fungi, lichen, and mosses.
10. Acquire some sphagnum moss and determine its water absorptive power by weight. (Should absorb about 200 times its own weight.)
11. Visit florist to observe uses of sphagnum.
12. Search for references to the medicinal uses of lichens in earlier times.

#### BIBLIOGRAPHY.

Basic Science Education Series. DEPENDENT PLANTS. New York: Row, Peterson & Co.  
Grout, A. J. MOSSES WITH A HAND LENS. New York.  
Thomas, W. S. FIELD BOOK OF COMMON MUSHROOMS. New York: G. P. Putnam's.

### GRADE 5. UNIT II: SPORE BEARERS.

#### TOPIC: FERNS, LYCOPODIUMS, HORSETAILS. (September)

#### UNDERSTANDINGS.

1. Ferns, Lycopodiums, and horsetails are grouped together and called Pteridophytes, the class of plants directly below the Spermatophytes or seed bearing plants.
2. The Pteridophytes were the first plants with true roots and the development of woody cells and vessels for the transportation of water from the roots through the stems to the framework of veins in the leaves.
3. Ancient members of this class of plants are exceedingly important today as they represent a large part of our present coal supply.

#### Ferns.

1. The fern family is millions of years old. Coal fossils show that leaf formation has changed very little through the ages.
2. Early ferns were as tall as trees. Some of the present jungle ferns are very tall.

3. A fern is a flowerless plant and reproduces largely by spores.
4. Fern spores develop into tiny leaflike plants called prothallia (singular prothallium) from which the first leaves, called fronds, grow.
5. In established plants the fronds growing from the rootstock first appear as fiddleheads, unrolling as they develop. It is in the fiddlehead stage that some ferns are used for food.
6. The fronds may be completely fertile, spore producing, completely sterile, non spore producing, or a combination of both.
7. Spore cases are varied in shape and position. Thus they are one of the principal means of identification.
8. In the Middle Ages many ferns were used for medicine. Some are still used.
9. The matted rootlets of the cinnamon fern are used for rooting and growing greenhouse orchids. The down of this fern is used as nesting material by several birds including hummingbird and chickadee.
10. Ferns of some species, especially the evergreen types, are used in quantity by florists. Fertile fronds, such as those of the sensitive fern, are also used decoratively.

### **Lycopodiums.**

1. The name Lycopodium is derived from two Latin words meaning wolf and foot.
2. The lycopodiums are very old; one Scottish coal bed consists almost entirely of the spores and spore cases of an extinct species.
3. Lycopodiums grow in woodlands and shady swamps. They creep near the surface of the earth by means of a horizontal stem with one growing end, no rootstock, but numerous roots on the underside.
4. Upright stems bearing many small, stiff, evergreen leaves rise from the horizontal stem.
5. Lycopodiums, though coarser, resemble mosses and are also known as clubmoss.
6. Lycopodiums are spore bearers, carrying their yellow spores in cone-like spikes or at the base of the leaves.
7. Lycopodiums have been used so extensively in Christmas decorations that they are now in need of protection in many parts of the state.
8. A very inflammable powder made from the spores is sometimes used in the manufacture of fireworks.
9. The common species of lycopodiums in Massachusetts are known by the common names of ground pine, princess pine, ground cedar, running clubmoss, and shining clubmoss.

### **Horsetails.**

1. The present day horsetails closely resemble many of their ancient ancestors, having jointed stems and whorls of remnant leaves.
2. Some horsetails have adapted themselves to drier habitats than most spore bearers and are to be found on sandy roadsides, railroad embankments, and similar locations.
3. The Common Horsetail has two types of growth, the sterile green plants with whorls of branches and fertile tan colored plants with whorls of small scale-like leaves, topped with spore producing cones.
4. The Scouring Rushes, perennials, prefer a swampy habitat. They have a long tapering growth terminating in compact spore cases. These plants contain gritty mineral particles and are actually an effective scouring material.

5. The sporophyte generation is the conspicuous one, the gametophyte generation being tiny flat green plants.

#### SUGGESTED APPROACHES.

1. A fiddlehead is seen growing on a fern plant.
2. Some fruiting fronds of a sensitive fern are displayed.
3. Pictures of any of the Pteridophytes are placed on the bulletin board.
4. Specimens of club mosses or scouring rush displayed.
5. A hummingbird's nest is exhibited, showing the down of the cinnamon fern.
6. A piece of coal is placed on the exhibit table.

#### ACTIVITIES.

1. Take a trip to the woods to look for ferns.
2. Hunt for club mosses. If none are located, study the different types from pictures.
3. Visit a greenhouse to see types of fern used for pot culture and to observe florist's use of ferns in bouquets.
4. Visit local druggist to learn of medicinal uses of Pteridophytes.
5. Where possible, collect a few scouring rushes and test their usefulness.
6. Collect sensitive fern fronds for later use in Christmas decorations or winter bouquets.
7. Collect spores and scatter them on damp peat moss kept in dim light. Watch and record development.
8. Start or make additions to school fern collection.
9. Sketch different types of fern fronds and spore cases, preferably from living plants, though pictures may be used.
10. Make spatter, ozalid, or blue prints of all local ferns.
11. Make a frieze showing different types of spore bearers.

#### BIBLIOGRAPHY.

- Wherry, E. T. *GUIDE TO EASTERN FERNS*. The Science Press Printing Co.  
 Wiley, F. S. *FERNS*. New York: American Museum of Natural History.

### **GRADE 5. UNIT III: LAND-WATER ANIMALS.**

#### **TOPIC: LIFE HISTORY OF DRAGON FLY. (October)**

#### UNDERSTANDINGS.

Note: See Grade 4, "Life in Pond and Stream". The understandings there will be furthered through the activities in Grade 5.

1. Many insects, harmful as well as helpful to man, hatch and develop in the water, e.g., harmful, mosquito; helpful, dragon fly.
2. Animals belong in families which are quite different from one another in structure and in ways of living, traveling, and obtaining food.
3. Some animals pass through several stages in their development; some are similar to the adults when they hatch.
4. Some insects pass through "gradual metamorphosis"; that is, the young, when hatched, look much like the adult. As they grow larger they pass through several molts until they finally

emerge with all adult structures completely developed. Examples of water insects passing through gradual metamorphosis are water striders, water boatman, back swimmers, giant water bug.

5. Some insects pass through "incomplete metamorphosis" in three stages: egg, naiad, and adult. Examples are dragon fly, damsel fly, stone fly, and May fly.

6. Some insects pass through complete metamorphosis in four stages: egg, larva, pupa, adult. Examples are caddis fly, scorpion fly, and mosquito.

#### SUGGESTED APPROACHES.

Mosquito larvae brought in.

Bulletin board display of insects which spend part of their life in ponds.

Story or magazine article about dragon flies or any other insect beginning life in the water.

News item concerning a drive against mosquitoes.

#### ACTIVITIES.

1. Prepare several large jars, gallon battery jars, or small aquaria. (See Grade 4.)
2. Take a trip to collect many different kinds of insects in pond or stream. Identify these. Place a different specimen in each jar, and label.
3. Select one to three for detailed study.
  - a. Family group. Structure. Make drawings.
  - b. Type of metamorphosis. Make pictorial life cycle charts of each one studied. These should be prepared as far as possible following actual observation of the insect in pond, stream, or aquarium.
  - c. Keep a dated record of any changes observed.
  - d. Observe activities: how insect moves about; protects self; how and what it eats.
4. Collect a giant water bug. Put it in a jar by itself. Put in a quantity of mosquito larvae. Watch what happens. Note the time when started and then when the larvae are gone. This will give an idea of natural control of pests.
5. For visitors, prepare an exhibit of the common insects of the pond. Put one insect in each tumbler. Place a question in front of each tumbler, calling attention of visitors to one thing. Ex. "How does this back swimmer hold his food? How does he eat?" or "How does this animal protect himself? Gently touch it and note the reaction."
6. Prepare posters that will show how some insects help and others harm. Ex. A large dragon fly on the wing catching a mosquito about to light on the nose of a person.
7. Prepare posters showing the beauty of some insects. Ex. Graceful, colorful damsel fly on the wing over water or the naiad in the water.

NOTE: Several of the activities listed under "Life in Pond and Stream" (Grade 4) might be taken in Grade 5, if not already done. Ex. Activities 6, 7, 8, and 11.

### GRADE 5. UNIT III: LAND-WATER ANIMALS.

#### TOPIC: LIFE HISTORIES OF FROGS, SALAMANDERS, NEWTS, AND TOADS. (April)

Select for special study amphibia common to the locality.

Amphibia are always of great interest to children. A variety of species are usually easily obtained. They are not difficult to keep in aquaria or terraria. They are not difficult to raise from eggs.

#### STUDY TOPICS.

1. Meaning of amphibia.
2. Animals (found in the locality) belonging to this group.

3. Peculiar characteristics and adaptations of this group. (External structure.)
4. Life histories of a common frog, salamander, or toad.
5. Food and eating habits.
6. Enemies and how each protects itself.
7. How they move about.
8. Value to man.

Note:— If plans are made to keep these animals in the classroom, aquaria, terraria, or a combination of the two may be built.

#### BIBLIOGRAPHY.

See Grade 4 Bibliography.

Bishop, Sherman C. HANDBOOK OF SALAMANDERS. Ithaca, New York: Comstock Publishing Co.

Macdougall-Hegner. THE SCIENCE OF LIFE. (for the teacher.)

Wright, A. A., and A. H. HANDBOOK OF FROGS AND TOADS. Ithaca, New York: Comstock Publishing Co.

For summaries of units worked out by teachers write  
Miss Maryclare Hayes, Green School, Lowell, Mass.  
Miss Lois A. Cole, Joseph Luther School, Swansea, Mass.

### **GRADE 5. UNIT IV: ANIMALS WITH BACKBONES.**

#### **TOPIC: RESPECT FOR REPTILES. (October)**

##### UNDERSTANDINGS.

1. The only reptiles found in Massachusetts are turtles and snakes. All reptiles are vertebrates, breathe with lungs, and have dry, scaly skins. The small animal commonly called a lizard here is actually a salamander, with the bare, moist skin of the amphibians. True lizards are reptiles, more southern in distribution, and are purely accidental in Massachusetts.

2. Because of their protective armor, turtles have existed on earth, in much their present form, for about 175 million years, during which time many other whole groups of animals have appeared and vanished.

3. Turtles live to a greater age than any other animals; the Common Box Turtle sometimes lives a century, and the Mauritian Tortoise has a possible life span of 150-200 years.

4. Turtles lack teeth but have both shells and backbones. The backbone and ribs are fused with the carapace, the upper shell.

5. Many species of turtles are found in Massachusetts: Musk, Snapping, Spotted, Wood, Blanding's (rare and local), Box, Diamond-back Terrapin (rare, Buzzards Bay area) and Painted. Sea turtles such as the Green, Hawksbill, Loggerhead, Hemp's and Leatherback occasionally wander as far north as our waters.

6. Turtles lay their eggs on land.

7. Most turtles, and especially the Musk and Snapping Turtles, will snap at objects held in front of their jaws. Generally speaking, the more incomplete the plastron (lower shell) the more aggressive is its possessor. The Snapping Turtle is notoriously bad-tempered when on land, and a large one is capable of inflicting injury when annoyed. On the other hand, the Box Turtle, completely covered below, is a docile pet.

8. Turtles are interesting and useful animals; there is little doubt that some turtles are valuable as destroyers of insects and other invertebrates. They deserve protection.

9. Snakes produce a feeling of fear and fascination in most people because of wide-spread ignorance concerning this group of animals.

10. Because a few snakes are poisonous most people fear all snakes and kill them on sight. They are held in greater disfavor by adults than any other animals.

11. Since the snake is an interesting and useful member of the community in which it lives, and a necessary part of the economy of nature, this attitude should be vigorously combated.

12. Many foolish superstitions exist regarding snakes. The snake is not slimy; as a reptile it has a dry, scaly skin, though it may feel clammy because the body temperature is usually lower than man's. Its tongue is not a poisonous stinger, but a soft, forked organ used as a sensory mechanism. There is no hoop snake which puts its tail in mouth and rolls along. Milk snakes do not milk cows and cause them to go dry; they frequent cow barns to catch mice. No one has ever proved that snakes swallow their young in time of danger; unborn snakes may appear to the ignorant to be in the mother's stomach — probably the foundation for this myth. The most wide-spread misconception is that all snakes are poisonous; on the contrary, only 36 of the 223 species of snakes found in North America are dangerous and only 2 poisonous species are found in Massachusetts.

13. Snakes are coldblooded animals which cannot withstand long the direct rays of the sun in hot weather, nor cold below the freezing point.

14. Many snakes reproduce by eggs laid on land. Some species of snakes bear living young. Most Massachusetts snakes are entirely harmless and beneficial. The only poisonous species are the Copperhead, extremely rare in the state; and the Timber Rattlesnake, which is confined to a comparatively few rocky ledges.

15. Snakes are entirely carnivorous. The smaller species live on insects and earthworms; water snakes feed largely on crayfish and frogs, and other large snakes eat rats, mice, and other small mammals.

16. Familiarity with live specimens will do much to abate uncomfortable and unnecessary fears.

17. Before snakes are collected for display in the schoolroom two precautions are necessary: a. escape-proof cages, and b. knowledge of the color patterns and shape of the head of our two poisonous species. The triangular heads, distinct from the rest of the body; the color patterns; the warning rattle of the rattlesnake (note that many harmless snakes also vibrate tails); these make identification and avoidance of dangerous species a simple matter.

18. Snakes consume so many harmful insects and rodents that most species are useful to man and should be protected.

19. Many species of snakes are found in Massachusetts: Eastern Ring-necked, Hog-nosed or Puff Adder, Smooth Green, Black, Pilot Black, Milk (or Checkered Adder locally), Northern Water (commonly called Water Moccasin and killed as a poisonous species), De Kay's or Brown, Red-bellied, Ribbon, Eastern Garter. There are two poisonous ones: Copperhead and Timber Rattler.

20. Poisonous species should not be collected nor displayed in the schools. Their safe handling is a matter for experts.

#### SUGGESTED APPROACHES.

Factual snake stories and personal experiences are told by teacher and pupils.

A turtle or cast snake skin is brought to the school room.

A turtle shell is displayed to show the backbone and ribs joined to the carapace.



## ACTIVITIES.

1. Pupils collect pictures and information about snakes and turtles.

2. Pictures showing characteristics of the two poisonous species are drawn by pupils for posting. These might include drawings of the triangular heads, poison fangs, and rattles, together with colored pictures of Copperhead and Rattlesnake. Include also picture of Milk Snake, pointing out differences in pattern, since this useful and harmless snake is often killed because confused with poisonous species.

3. Bring in a turtle, and a small, harmless snake. The introduction of a small snake first, followed by those of larger size, is recommended to overcome fears already established in teacher or pupils.

4. Read portions of "Snakes Alive" by Clifford Pope to gain a better understanding of snakes.

5. Take a trip to Natural History Museum and zoo.

6. Make posters showing food habits of snakes and illustrating true-false ideas about them.

7. Make dioramas showing snakes in proper habitats, with clay models for the animals. Other dioramas may show their usefulness to man.

8. Prepare a Reptile Corner in the school room, with pictures and drawings, posters, books, and magazines containing information and stories about these animals.

9. Include in this corner a large cage, with both land and water areas for turtles, and cages for snakes. The latter may be made simply, but need screened ventilation holes or screened sides, and must be tightly covered to prevent escape. Heavy glass, sliding in grooves, makes the best roof or side opening. Cages should be kept clean and dry and need only be furnished with a dish of water and a rock or rough branch.

10. Collect species of local turtles and snakes for the Reptile Corner. They need no food if kept but a few days, and should be returned to their natural homes before the ground freezes. For catching snakes one needs a pair of leather gloves, and a plain stick or one with an angle iron on one end to hold the snake down until it can be grasped by the neck. Drop snake in a cloth bag (sugar, salt, or flour bag) or old sock, and tie end up tightly. A frightened snake will bite unless the head is held directly back of the jaws; however, the bite of the harmless varieties is hardly painful and not in the least dangerous. If the skin is ruptured; a disinfectant should be applied as in any skin puncture.

11. Arrange for a demonstration by science teacher, museum curator, or older pupil on proper handling of snakes. Stress slow movements, gentle handling, and allowing an active snake to move from hand to hand freely. After the first handling, most snakes are docile.

12. Study a snake's motion, noting the two methods used. Side-wise movement like a stream of water running along a winding bed; in this method the snake uses a series of pivots, such as stems of plants or bits of dirt or stones, to move its body forward. The caterpillar movement, where some of the scales on the underparts are erected by muscles attached to the ribs; these catching on anything rough allow forward movement through a wave-like action of the muscles. These motions may be studied by turning snakes loose on the playground, guarding against their escape.

13. Study the jaws of a snake, which permit the animal to swallow food larger in diameter than itself. Note that the bones of the jaw are hinged so that the lower jaw drops down and the halves spread apart.

14. Give talks to lower grades, stressing the harmlessness of most snakes and their useful food habits. Illustrate with live material in the room collection.

## BIBLIOGRAPHY.

- Babcock, Harold L. FIELD GUIDE TO NEW ENGLAND TURTLES. Boston: Museum of Science.
- SNAKES OF NEW ENGLAND. Boston: Museum of Science.
- Basic Education Series. (Science). REPTILES. New York: Row, Peterson Co.
- Conant, Roger. REPTILES AND AMPHIBIANS OF THE NORTHEASTERN STATES. Philadelphia: Zoological Society.
- Ditmars, Raymond L. REPTILES OF NORTH AMERICA. New York: Doubleday, Doran Co.
- Hoopes, Isabel. REPTILES IN THE HOME ZOO. Boston: Museum of Science
- Pope, Clifford. AMPHIBIANS AND REPTILES OF THE CHICAGO AREA. Chicago: Natural History Museum.
- SNAKES ALIVE AND HOW THEY LIVE. New York: Alfred A. Knopf Co.
- TURTLES OF THE UNITED STATES AND CANADA. New York: Alfred A. Knopf Co.
- Schmidt and Davis. FIELD GUIDE OF SNAKES. New York: G. P. Putnam's Sons.

**GRADE 5. UNIT IV: ANIMALS WITH BACKBONES.****TOPIC: MAMMALS. (December)**

## UNDERSTANDINGS.

1. There are about 4,000 species of mammals in the world.
2. All mammals are warm-blooded, breathe air through lungs, have hair projecting from pits in the skin. There are two types of hair. The contour hairs are long and strong. The woolly hairs are short and constitute the under fur. Air spaces between prevent loss of body heat.
3. Mammals range in size from the shrew to the whale-bone whales.
4. Most mammals live on the ground. Many live in water. Some live in trees. Bats live in the air.
5. Some mammals are active during daylight hours; others are active at night.
6. Some New England mammals hibernate in the winter. Those known as the "Seven Sleepers" are the chipmunk, bat, skunk, raccoon, woodchuck, bear, and jumping mouse.
7. Some tropical mammals aestivate in summer.
8. Most mammals are not brightly colored.
9. Mammals protect themselves in various ways: by their coloring, by "freezing", by fighting with their teeth, claws, nails, horns, and hoofs, and by running away rapidly.
10. By examining a mammal or his tracks we can tell a great deal about the way he lives.
11. The type of teeth indicates the kind of food eaten. Only whale-bone whales, egg-laying mammals, and anteaters are toothless as adults.
12. If a mammal's nostrils slant to the side of his nose he picks up air-borne scents. If his nostrils are on the front of a flat nose he smells on the ground and uses his nose for digging.
13. If the eyes are placed on the sides of his head he is hunted and has many enemies. If his eyes are in front he is a hunter.
14. The shape of the body indicates whether he is a fast or slow moving type and whether he runs his prey to the ground or hunts by stealth.
15. Jumping mammals have broad hips and large hind feet.
16. Many mammals have tails to aid in balancing when they jump or run, or to use as rudders when swimming. Some mammals use their tails as weapons, fly-swatters, signals, or to

express emotion. Mammals who sleep outdoors in cold weather put their tails across their noses to warm the air and prevent their lungs from freezing.

17. Man uses mammals as beasts of burden, for transportation, as pets, for wool, fur, leather, and oil.

18. Many wild mammals help us by controlling pests. Some destroy our gardens and houses.

19. The beaver, with his dams, conserves water and prevents floods.

20. We need to keep down the numbers of some mammals, yet do not wish any species to become extinct.

#### SUGGESTED APPROACHES.

The class makes a trip to a nearby fox or mink farm.

A child reports a new puppy or kitten in his household.

A squirrel is seen at the classroom bird feeder.

A child brings a mammal pet to school.

A story or poem or newspaper item about a mammal is read aloud.

#### ACTIVITIES.

##### A. In the classroom.

1. Look up and report on the local hunting and trapping laws.
2. Discuss the wisdom of the laws and the reasons for them.
3. Discuss the effect of forest fires on mammals. What can we do about preventing fires?
4. Have a hamster for a classroom pet and observe his habits.
5. Bring a dog or cat to school and discover what he eats, how he hunts, and protects himself.
6. Observe any mammals that come to the bird feeder.
7. What things in the schoolroom (including clothes and lunches) came from mammals?
8. Bring in pictures of native mammals and use them in making a mammal map. Indicate the family each belongs to.
9. Discuss what mammals are becoming too scarce and what can be done to protect them.
10. Discuss mammal pests and how they can be controlled if necessary.
11. Sketch, paint, or model native mammals.
12. Have individuals study some mammal they dislike, and try to discover its value to man, and report to the class their conclusions.
13. Make illustrated booklets, charts, or frieze showing individual means of self-protection.
14. Make three-dimensional or diorama pictures of habitats of specific mammals.
15. Make a picture graph showing relative sizes of Massachusetts mammals from shrews to whales.
16. Make a chart showing adaptations of mammals to climatic conditions at different seasons, such as hibernation and aestivation.

##### B. Outside activities.

1. Visit a zoo or pet store.
2. Visit a farm and count the types of mammals and their various uses.

3. Hunt for tracks in freshly fallen snow or muck by pond or brook.
4. Make plaster casts of tracks.
5. Observe and report on the way different mammals use their tails.
6. Try to tame, without catching, a wild mammal so that it will come to your hand to feed. A chipmunk is a good daytime animal to work on. If you stay up late summer nights, put out pans of milk for skunks and see how tame they become.
7. Take pictures of wild mammals.
8. Make a scrapbook of mammal pictures and stories.
9. Decide why some mammals live in trees, some on the ground, some under the ground. Why do some hunt food during the day, others at night?
10. Learn to imitate mammal sounds.
11. Try to "rabbit leap" during recess.

#### BIBLIOGRAPHY.

- Anthony, H. E. FIELD BOOK OF NORTH AMERICAN MAMMALS. Putnam's.
- Cahalane, Victor H. MAMMALS OF NORTH AMERICA. New York: Macmillan, 1947.
- Driver, Ernest C. NAME THAT ANIMAL. Northampton, Massachusetts: Kraushar Press.
- Hamilton, W. J. AMERICAN MAMMALS. New York: McGraw-Hill.

### **GRADE 5. UNIT IV: ANIMALS WITH BACKBONES.**

#### **TOPIC: ANIMAL PETS. (March)**

Keeping a domestic pet helps a child to develop a sense of responsibility, a regular routine, and the satisfaction of providing for and protecting a dependent creature.

The proper care of such pets as cats, dogs, rabbits, white mice, or canaries should be discussed in class.

Keeping wild animal pets in permanent captivity should not be encouraged, though they may be kept for short periods for study.

Stress the preparation of adequate quarters, providing sufficient space, air, correct temperature and moisture conditions, and certainty of confinement. The last is particularly important in regard to reptiles.

A knowledge of food, feeding habits, and the availability of proper food is essential.

In the care of class room pets, specific duties should be assigned to pupils and a detailed chart kept, so that a responsible person may keep accurate check on the regular care of these animals.

In releasing animals, care should be taken to free them in suitable environments.

Trips may be made to local farms, zoos, or natural science museums to observe feeding and housing of captive animals.

#### BIBLIOGRAPHY.

- Bianco, Margery. ALL ABOUT PETS. New York: The Macmillan Co.
- Comstock, Anna B. THE PET BOOK. Ithaca, New York: Comstock Publishing Co.
- Moore, Clifford B. THE BOOK OF WILD PETS. New York: Putnam and Co.
- Write S.P.C.A. and Animal Rescue League, Boston, for material on care of Pets.

**GRADE 5. UNIT V: SIX-LEGGERS.****TOPIC: THE GRASSHOPPERS AND THEIR KIN. (October)**

Children are always fascinated by grasshoppers and other insects of this group; namely, crickets, katydids, praying mantis, roaches, walking sticks and termites. Grasshoppers are easy to catch. The "song" of the crickets and katydids adds to the charm of summer picnics and over-night hikes. The appearance of the walking stick and the antics of the praying mantis are as fascinating as acrobatic clowns, while roaches and termites are objects of disgust or worry.

In the lower grades children have watched the activities of grasshoppers and crickets while on trips to the meadow. They have collected them for a fernery covered with wire, where they fed and studied them with other insects. Now they are ready for a more detailed study.

**TOPICS FOR STUDY.**

1. Different species of grasshoppers.
2. The anatomy of the grasshopper. What makes it possible for the grasshopper to travel such long distances?
3. Life cycle of the grasshopper, example of gradual metamorphosis.
4. Activities of the grasshopper. Economic importance.
5. Study of the "Family Tree" of the grasshopper. Observe other members of this group in less detail and more for the economic importance of each one, especially the roaches, termites, and praying mantis.

**ACTIVITIES.**

1. Build insect cages in which to keep different members of this family. Grasshoppers, crickets, katydids are easily collected and cared for. The mantis is less commonly found in the field in Massachusetts, but live specimens may be obtained from biological supply houses. They make fascinating "pets".  
Termites and roaches are less desirable to have around. One specimen in an escape-proof jar should be sufficient.
2. Keep dated records of observations made.
3. Take field trip. Try to find a specimen in each of the six molts. Can a discarded skin be found? A grasshopper laying eggs?
4. Study the body "mechanisms" under a hand lens. Discover through observation how a grasshopper jumps, flies, sees, hears, breathes, eats, escapes enemies, makes a noise.
5. Find out what other insects belong in this family. Compare each with the grasshopper.
6. Study the economic importance of the grasshopper and its kin; include stories of grasshopper plagues.
7. Find out what are some of the natural controls of these insects. What are some of man's control methods?
8. Small leaflets may be prepared on the grasshopper and its kin, illustrated with drawings.
9. Collect insects for an "insect orchestra".
10. Collect stories and poems to show man's interest in grasshoppers, dating back to Old Testament days. Find out how grasshoppers have entered into the history of our country.
11. Write the U.S.D.A. in Washington for material on control measures for termites, roaches, and grasshoppers.

## BIBLIOGRAPHY.

- Bronson, Wilfred S. THE GRASSHOPPER BOOK. Harcourt, Brace & Co.
- Comstock, Anna B. HANDBOOK OF NATURE STUDY.
- Sanderson, E. Dwight, and Peairs, L. M. INSECT PESTS OF FARM, GARDEN AND ORCHARD. John Wiley & Sons.
- Croxton, W. C. SCIENCE IN THE ELEMENTARY SCHOOL. McGraw-Hill Co. (Insect Orchestra)
- King, Eleanor and Pessels, Wellmer. INSECT PEOPLE. Harper Brothers. (Children)
- Phillips, Mary G. and Wright, Julia M. NATURE, BY SEASIDE AND WAYSIDE, BOOK 3. D. C. Heath & Co. (Children)

**GRADE 5. UNIT V: SIX-LEGGERS.****TOPIC: ANTS. (April)**

Ants make a fascinating study. Because there are so many species available and because they are so widely distributed, ants are comparatively easy to obtain. Their care is easily learned. An observation nest can be made by the children or bought for less than four dollars. The kind which has no earth in it is best, as earth obstructs the view. All activities except tunnel excavations can be observed.

Ant colony activities can be observed and recorded in the field. Different species of ants may be collected and identified. The relationship between ants and other insects may be observed.

## TOPICS FOR STUDY.

1. Different species of ants.
2. The anatomy of the ant.
3. Life cycle of the ant.
4. Activities of worker, queen, male.
5. Different types of natural homes; e.g., harvester ants build mounds, carpenter ants live under the bark and in the trunk of dead or dying trees and stumps.
6. Work in the nest.
7. Economic value of the ant.

## ACTIVITIES.

1. Build and maintain artificial ant nest.
2. Keep dated records of observations; e.g., egg laying, when pupa case is made, when callow ant emerges.
3. Introduce "enemy species" and note what happens.
4. Experiment to find effect of heat, cold, wet, dry, light, dark, quiet, jar, noise, disturbance of eggs or pupa.
5. Follow activities of individual ants.
6. Study the relationship between ants and aphids.
7. Write a small leaflet on the ant, his activities, his value.

## BIBLIOGRAPHY.

- Bronson, Wilfred S. THE WONDER WORLD OF ANTS. New York: Harcourt, Brace and Company.
- Comstock, Anna B. HANDBOOK OF NATURE STUDY.
- Gall, Alice C., and Crew, Fleming H. THE LITTLE BLACK ANT. New York: Oxford University Press.
- Lutz, Frank E. FILED BOOK OF INSECTS. New York: G. P. Putnam's Sons.
- Phillip, Mary G. ANT HILLS AND SOAP BUBBLES. Boston: D. C. Heath & Co.
- Swain, Ralph B. THE INSECT GUIDE. New York: Doubleday.
- Wheeler. ANTS, THEIR STRUCTURE, DEVELOPMENT, AND BEHAVIOR. New York: Columbia University Press.
- Turttox Service Leaflet No. 35. "Studying Ants in Observation Nests." (Free to teachers.)

**GRADE 5. UNIT VI. GARDENS, TAME OR WILD.****TOPIC: SEEDS. (November)**

## UNDERSTANDINGS.

1. A seed has three parts: a. a tiny living plant; b. food for this tiny plant; c. a coat, covering both.
2. Some plants produce flowers; flowers produce seeds; seeds develop into plants; the story repeats itself.
3. Seeds have many different ways of traveling.
4. Seeds are insurance of plant survival.
5. Wild white berries should be avoided unless you are sure that they are not poisonous to the touch.
6. No berries should be eaten, regardless of color, unless you are sure they are edible.

## SUGGESTED APPROACHES.

Soak beans overnight. Give one to each child and let him peel off the coat and separate the food halves to find the tiny plant.

Explore the school grounds, collecting seeds. A trip to a nearby vacant lot should add variety to the collection.

Tell a story of a milkweed seed — how it may travel a long distance by air and water and finally wash into the ground and develop into another plant with flowers and finally seeds again. Discuss what would happen if all the seeds merely dropped to the ground at the foot of the parent plant.

Have a maturing fruiting branch of witch hazel in water, which will result in seed explosion.

Have locust seed case floating — seed case "ferry boat".

## ACTIVITIES.

1. Experiment with seeds. (See PRIMARY GUIDE, Grade 3, pp. 176-178.)

Roll a blotter so that it will fit inside a drinking glass or jar. Put some water in the glass. Place several beans between glass and blotter, above the water level. Keep in a dark place until sprouted, adding water as needed.

Plant some beans and other seeds in flower pots. Grapefruit seeds are fun to try. Keep records of growth.

Plant corn (monocot) and a bean (dicot) in the same pot. After the seeds have germinated, compare the seed leaves and the true leaves.

Germinate some seeds, such as radish seeds, between wet blotting papers or inside wet cloth. After they have germinated, suspend the sprouted seedlings in a glass of water by putting the roots through holes in a paper, which covers the top of the glass. Study the formation of the roots. Look at root hairs through a reading glass. Try to find out their function.

Start seedlings in a pot or seed flat; e.g., nasturtiums, peas or beans, sunflower seeds. Put the box near the window and keep it in the same position. Note the reaction of the seedlings to light. Turn the box around and see how the plants react.

Take two pieces of glass about three inches wide and six to eight inches long. Place a blotting paper between with radish seeds scattered along the blotter. Tie the two pieces of glass together. Stand one end in water so a few seeds are immersed. Watch growth. Which seeds grow best? Those in water? Where it is damp? Where it is dry?

Put a blotting paper inside a jar with radish seeds between the glass and blotter. Pack wet sand into the jar. Keep it wet. Put where it is warm. After the seeds have germinated, note the direction the root is growing. Turn the jar upside down. Watch the tip of the root.

Keep records of all experiments: what you are trying to find out; what was used; what was done; what happened; why.

2. Find and list all the different terms given seed cases; e.g., corn husks, bean pods, rose hips, nut shells (outer), berry, pome fruits (apple and pear), drupe (blackberry), cone. Set up an exhibit of each type labeled.

3. To emphasize the reproductive capacity of plants, count the number of seeds on an ear of corn, or put the seeds from one pumpkin in a jar and have a guessing contest.

4. Gather seeds from home gardens for next year's planting. Label and store.

5. Visit local fair, noting kinds of seeds exhibited.

6. Hold fruit fair in the classroom. Note: This includes any seed cases; e.g., corn, tomatoes, beans, squash, peppers, egg plant.

7. Make a list of the various kinds of seeds or seed cases eaten by the class for some meals. Remember seasoning and spices.

8. Study seeds as wild animal food.

a. What seeds do birds eat?

b. What seeds are preferred at your bird feeding station?

c. What mammals eat seeds? (Field mouse and grass seed.)

d. What insects eat seeds? (Weevil and beans.)

9. Study the shapes of tiny seeds with the aid of a magnifying glass.

10. Test the traveling ability of seeds in various ways; e.g., toss a "glider" into the air, launch a "paratrooper", or allow a "hitch-hiker" to ride on your coat sleeve.

11. Make a chart of the ways that seeds travel, using the seeds that you have collected. Name the seeds according to their methods of traveling; e.g., milkweed seeds are "paratroopers", maple seeds are "gliders", grass seeds are "airborne", burdock seeds are "hitch-hikers", acorns travel by "squirrel freight", cherry seeds travel by "bird express", witch hazel seeds are "time bombs".

12. Make winter bouquets using seeds and seed cases.

#### BIBLIOGRAPHY.

Basic Science Education Series. SEED AND SEED TRAVELS. Evanston, Illinois: Row, Peterson and Company.



**GRADE 5. UNIT VI: GARDENS — TAME OR WILD.****TOPIC: FALL WORK IN A GARDEN; PREPARING FOR WINTER. (November)****UNDERSTANDINGS.**

1. Good gardens require much care. Fall care is primarily harvesting, cleaning up, and planning for spring.
2. Annuals germinate, flower, and mature seed in one season.
3. Biennials require two years for maturity, the first season making vegetative growth only, the second year producing seed. (Many vegetables are in this group.)
4. Herbaceous perennials have roots living from year to year but their tops die to the ground each season.
5. Woody perennials may or may not lose their leaves during the winter, but the stems remain alive through the year.
6. Seeds, fruits, root crops, and tender bulbs should be harvested.
7. Frost retards or kills most green growth above ground.
8. Gardens should be cleaned up as plants are harvested or die.
9. All plants should be thoroughly examined, and any showing disease or insect activity should be burned.
10. All other garden waste should be added to the compost heap to make humus.
11. A weed is a plant out of place, regardless of kind or size.
12. All weeds should be removed.
13. Gardens should be protected against erosion during the winter by cover crop or mulch.
14. Covering perennials after the ground has frozen with mulching material will prevent erosion and lessen evaporation.
15. Spring flowering bulbs may be planted in the fall.

**SUGGESTED APPROACHES.**

When weather report warns of frost, it is suggested that any late blooming plants be covered for the night.

Opportunity is given pupils to compare notes on summer gardening activities.

Raking leaves at home to add to the compost heap is recommended.

Fall plowing is observed, either near the school, or while riding in the country.

Someone tells of a trip to see the autumn leaves. This is a good opening for discussion of natural mulching.

Effects of the first killing frost of the season are discussed.

**ACTIVITIES.**

1. Take a trip to observe natural preparation of plants for the winter, seed dispersal, falling of leaves, and bud formations.
2. Take a trip to observe gardener's preparations for winter.
3. Help put the school garden to bed. Help in the home garden. Winter rye may be used for a garden cover crop, while clover and alfalfa are good field cover crops, especially where they can be left undisturbed for a year or more so that the nitrogen nodules may form on the winds.
4. Before frost, take cuttings of such plants as geraniums, wandering jew, coleus, or begonias, for winter window garden.
5. Mint, parsley, or chives make good pot plants for winter culture indoors.

6. Take in reserve supply of soil for use in winter experiments.
7. Note and list by appearance and behavior whether plants are annual, biennial, or perennial. Check findings with seed catalog or garden book.
8. Take a trip after first killing frost to observe, or have committee report, where the damage was greatest, and the topography of damaged areas. Try to determine the reasons for damage or escape.
9. Plant bulbs, either in school or home gardens, or in pots or window boxes, for winter or spring bloom indoors. Follow special instructions in bulb catalog or garden book as to depth of planting, type of soil, and other special requirements.
10. Paint, grease, and repair garden tools, and store in a dry place for the winter.
11. Take up pots of soil from various gardens, at random. Keep warm, well watered, and note results.

#### BIBLIOGRAPHY.

- Beaumont, Arthur B. GARDEN SOILS, THEIR USE AND CONSERVATION. New York: Orange Judd Publishing Company, 1948.
- Dempsey, Paul. GROW YOUR OWN VEGETABLES. Boston: Houghton Mifflin Company.
- Write State Experiment Station, Amherst, and U. S. Department of Agriculture, Washington, for pamphlets.

### **GRADE 5. UNIT VI: GARDENS, TAME OR WILD.**

#### **TOPIC: HOUSE PLANTS. (January)**

#### UNDERSTANDINGS.

1. The specific habitat requirements of plants (soil, light, drainage) need to be reproduced as nearly as possible in indoor culture.
2. House plants are attractive for bloom or foliage.
3. House plants may be edible. (A pot of parsley, mint, or chives, for table garnishes.)
4. Terraria, aquaria, or desert plants make attractive winter gardens. (Structure and maintenance of these are incorporated in other units.)
5. Regular care in watering and feeding is most essential for successful growth of house plants.
6. Plants may be reproduced or propagated by means of seeds, bulbs, or leaf, root, or stem cuttings. House plants are propagated.
  - a. frequently by stem cuttings; e.g., geranium, coleus, impatiens, wax begonias.
  - b. occasionally by leaf cutting; e.g., African violet, rex begonias, some succulents.
  - c. sometimes by bulbs; e.g., narcissus, Easter lily, oxalis.
  - d. in special cases, by seeds and root cuttings.
7. Cuttings should be made with a sharp knife, cut at an angle, and include terminal or lateral leaf buds and one or more leaves, and at least one node where roots may originate. roots. Mulch may need to be anchored by brush, wire, or boards to prevent blowing away in high wind. Cuttings should be rooted in water or washed sand. Soil may be used but is less desirable.
8. Attractive containers of suitable size should be provided and plants re-potted as they outgrow their containers.
9. Occasional pruning of terminal buds tends to produce stocky plants.
10. Plants should be inspected periodically for indications of disease or insect activity. Common insects are aphids, mealy bugs, or scale. (Refer to gardening manual for their control.)

11. House plants should be sprinkled occasionally to remove dust, which can clog breathing pores and reduce absorption of light.
12. Preparation of potting soil is based on food needs of plants to be potted.

#### SUGGESTED APPROACHES.

- A narcissus bulb may be brought in to plant in water or soil.  
 Teacher requests that a small sweet potato, carrot, onion, orange, or grapefruit seeds be brought in for experimenting.  
 A house plant cutting is placed in water to develop and be watched.

#### ACTIVITIES.

1. Keep a log of any plants growing in the classroom, recording dates of starting, blooming, feeding, or pruning, measurement of growth at regular intervals, number of cuttings taken (if any), any insect or disease indications, and any other pertinent information.
2. Take cuttings from well established plants for soil, water, and light experiments.
3. Take cuttings to start new plants to be used as Easter gifts.
4. Prepare sand for cuttings and soil for planting or re-potting. Follow formula in good reference book.
5. Study seed catalogs and garden books for information about wild ancestors and native locality of common house plants.
6. Make a map to illustrate above.

#### BIBLIOGRAPHY.

- Wood, Allen H. Jr. GROW THEM INDOORS. Boston: Ralph T. Hale & Co.  
 PLANTS FOR THE HOME. Boston: Ralph T. Hale & Co.  
 The Basic Science Education Series. GARDEN INDOORS. Row, Peterson & Co.  
 School Nature League Bulletins. New York: National Audubon Society.  
 PLANT PROPAGATION IN THE CLASSROOM, Series 10, Bulletin 2.  
 SELECTION AND CARE OF PLANTS IN THE CLASSROOM, Series 14, Bulletin 2.

### **GRADE 5. UNIT VI: GARDENS — TAME OR WILD.**

#### **TOPIC: SPRING WORK WITH PLANTS, INDOORS AND OUT. (May)**

#### UNDERSTANDINGS.

1. A school garden may be vegetable, vegetable and flower, or flower, depending on location, soil, sunlight, moisture, and length of time it is to be observed. Flower gardens may be annual (especially if space is available for only one season); biennial; perennial; wild (if location is suitable and permission can be obtained to take plants from woods, fields, or swamps).
2. Gardens should first be planned on paper.
3. A vegetable garden is planned with regard for proper spacing of plants and rows, and height of plants. Flowers should be selected for good color schemes and approximate time of blooming.
4. After garden is planned, the source of supply of seeds, cuttings, or bulbs should be determined.
5. Good seed, free from disease and true to name, is important.
6. Proper use and care of necessary tools is essential.

7. Soil should be well prepared.
8. Planting directions should be carefully followed.
9. Gardens require care through the entire season.
10. Cultivation is necessary to keep the weeds under control, help conserve moisture, and aid aeration of soil.
11. A constant watch should be kept for indications of disease and insect activity.
12. Those plants which require a longer growing season than our climate affords, or those which we wish to mature earlier than they naturally would, are started indoors early in the spring.

### **Window Boxes.**

1. House plant cuttings, low growing annuals, and trailing plants are suitable for window boxes. Many plants are not.
2. Metal or wooden boxes with proper drainage are suitable containers.
3. Preparation of soil is similar to that for house plants.

### **SUGGESTED APPROACHES.**

Seed catalogs are introduced.

Reports of any gardening activities observed at home, on the way to school, in city park or garden, or on a farm are suggested.

Volunteers to help with the school garden are requested.

Seeds collected and stored in the fall are recalled.

The window box of bulbs planted last fall is brought out.

### **ACTIVITIES.**

1. Choose site for garden and, if necessary, get permission to proceed.
2. Decide type of garden best suited to site.
3. Plan garden on paper, using reference material for necessary information about the selected varieties — size, color, season of maturity, expense, special cultural care, and any other factors.
4. Acquire necessary tools. In a small garden these tools will be spade, fork, rake, weeder, and trowel. If already available, check over for the need of repair.
5. Arrange for acquisition of seeds, plants, or bulbs, from materials stored previous year, from pupils, friends, or reputable supply house.
6. Prepare garden site. Spade (or have plowed), add fertilizer, and level. Mark rows carefully in a north, south direction to utilize maximum sunlight with due regard to plant needs for space.
7. Start a few of the recommended annuals indoors in pots or flats, such as marigolds or zinnias. Transplant these as necessary.
8. Plant garden according to seed package or garden book instruction and keep careful record of dates of planting, germination, transplanting, maturity.
9. Compare records of different species.
10. If any disease or insect activity is noted, consult garden manual for identification and control.
11. Cultivate and weed garden regularly.
12. Appoint committees to carry on during the summer vacation or ask a 4-H club or local garden group for aid.

13. Plan window boxes. Prepare soil and plants. Continue care.
14. Watch for and record animal life observed in garden, other than insects; e.g., toads, worms, or birds.
15. Invite local garden authorities to give advice and suggestions.

## **GRADE 5. UNIT VI: GARDENS — TAME AND WILD.**

### **TOPIC: SAVE THE SOIL. (April)**

#### UNDERSTANDINGS.

The study of erosion is a specific phase of the broad subject of conservation. It is a study of basic importance; and even young children can and should be made aware of what is meant by "wise use of soil".

These lessons on erosion may be taken as part two of the soil study, or soil and erosion may be taken together, including all related subjects; e.g., water and rainfall, weather, forestry, farming, gardening, and wild life.

#### STUDY TOPICS.

1. Kinds of Erosion: geologic erosion, man-made erosion.
2. Natural Agencies.
  - a. Water Erosion.
 

Natural and human factors influencing rate of water erosion.

Damage, physical and economic.

Meaning of sheet erosion, gullies, friability, permeability, compactness, drainage, bedrock or hard pan, "degree" of slope, deposition, streambank cutting.
  - b. Wind Erosion.
 

Natural and human factors influencing wind erosion.

Damage: vegetative cover, porosity of soil, wind breaks, over-cultivation, over-pasturing, drainage, water table, muck soil, silt.
  - c. Glacial Erosion. (Geologic) Results.
 

Lowering level of land by scouring.

Pulverizing of scoured material.

Mixing and carrying away pulverized material.

Deposition of material carried.
  - d. Gravity Erosion.
 

Landslides, sliding of road banks, railroad cuts, and fills.
3. Conservation Measures.
  - a. Water.
 

Methods used to slow down runoff, take care of excess water, control head waters. Soil erosion control measures also conserve water.
  - b. Soil.
 

Vegetative measures: (a) improve and increase woodland cover, protect from fire and grazing livestock (fencing of pastures), use improvement cutting methods, plant trees in areas not suitable for agricultural purposes, encourage useful wildlife, especially birds; (b) improve grass and legume cover; improve pasture through study of lime and plant food needs, best grass and legume seeds for locality, control of grazing, rotation, mowing, measures to conserve rain water, taking care of field borders.

Cultural measures: (a) study of meaning of contour tillage, contour planting, strip cropping, crop rotation.

Engineering measures: (a) study meaning of diversion ditches, terraces, outlets, gully control, drainage, control of road bank erosion.

As in the study of soils, erosion problems should be presented and studied through real experiences, vicarious experiences being used only to verify, enlarge, and clarify findings. Children should be given the opportunity to study and understand the erosion problems of their own school yard and town, then to survey the state, and, in less detail, national erosion problems and water conservation activities. They should be given the opportunity to do something constructive about the problem on school grounds or/and in the town.

#### ACTIVITIES.

1. Trips. (Take notes and record findings in some graphic form.)
  - Study soil erosion problems of the school yard. Try to decide the type of erosion present and correct methods of control and restoration.
  - Visit neighboring farm.
    - To study effects of heavy rainfall: muddy water, sheet erosion, silt deposition, gullies.
    - To study conservation farming practices being used. Have farmer or specialist explain them.
  - Visit a cut-over or burned-over woodland.
  - Visit a woodlot where conservation practices are being used. Note condition of soil, number and variety of wildlife, condition of surrounding country. Compare with cut-over or burned-over area.
  - Visit silt-laden and muddy streams. Determine where silt came from and where it will go, and causes of this condition.
  - Visit a community or county fair to study the restoration and conservation exhibits.
2. Experiments.
  - See experiments under SOIL.
  - To show results of quick run-off of water.
  - To show the effects of rain on land with no cover, thin cover crop, thick cover crop.
  - To show the effect of water run-off on level and sloping land.
  - To show effects of flood control.
  - To show water absorbing ability and water holding capacity of different soils.
3. Build model farms; or show exhibits, using pictures collected, reports, diagrams, photographs or drawings, showing the effects of soil erosion, deforestation, and conservation farming practices.
4. Study through reading or interviewing some authority
  - Local soil erosion.
  - Lowering of the ground water table.
  - Increase in flood damage, and muddy streams.
  - Decrease in wildlife.
5. Talks by county agent, or representative of the Soil Conservation Service on soil erosion, accompanied or followed by a field trip conducted by the same authority.
6. Show films. There are many excellent films on this whole problem.
7. Take erosion control measures on the school grounds; e.g., planting trees and shrubs, grass or other ground cover, building drainage ditches.
8. Study land capability maps of some local farm. Visit farm, and compare map to the land. Compare the way the farmer is using the land to the land capability as shown on the map. Where there is marked deviation, try to determine the reason.

9. Make a simple "capability" map of the school grounds. Try to get the advice of an authority.

10. Make a simple farm level and practice running contour lines on the school grounds, or on a nearby field.

11. Show diagrammatically (or through other graphic means) the Hydrologic Cycle, "The eternal merry-go-round."

12. Writing and talking activities.

Write the University of Massachusetts and the U. S. Department of Agriculture for pamphlets, illustrative materials, bibliographies, and lists of available films on soil, forest, and water conservation.

Make a collection of pamphlets, booklets, pictures, and books dealing with the problem of soil, forest, and water conservation.

Committees study and report on various phases of soil restoration and conservation.

Prepare pamphlets on local erosion problems, illustrated with drawings, maps, photographs, diagrams, tables, and graphs.

13. Prepare large maps of locality. On these put main topographical and vegetation features, highways, streams, lakes, urban and farming areas, points of bad erosion, and places where conservation practices can be found.

Note: Many of the suggestions included here came from material prepared by the Education Section of the Soil Conservation Service, U. S. Department of Agriculture, and from the booklet CONSERVATION ILLUSTRATED.

#### BIBLIOGRAPHY.

See SOIL unit.

Note: For another approach to the problem of Conservation, see Social Studies Section.

### **GRADE 5. UNIT VI: GARDENS — TAME OR WILD**

#### **TOPIC: SOIL.**

#### UNDERSTANDINGS.

The study of soil is of great importance, so that children will know the needs of their own school garden and understand the vital importance of soil to life. To deplete the soil, or make it unproductive through misuse, would end all life.

A country's wealth comes from the soil. Unlike oil, coal, and minerals, which are not renewable resources, crops, fruit, live stock, forests, game, fur, and fish are renewable if richness of the soil is preserved.

Elementary school children should become acquainted with the soil, should understand the importance of the water table, and the need of protecting water sheds. They should learn the causes of soil depletion, what is being done to reduce erosion, and government activities to educate citizens in correct use of soil, forest and woodlots, water and wildlife.

#### STUDY TOPICS.

1. How important is the soil?
2. What is soil?
  - a. Meaning of terms.  
Soil texture: gravel, sand, silt, clay, loam.  
Organic matter and its place in the composition of soil.

Humus.

Soil profile: top soil, subsoil, parent material, bedrock.

Soil structure.

Productivity.

b. The place and importance to soil of the following.

Roots of living plants.

Animals, including worms and insects. (See Unit 1, Grade 6).

Bacteria. What is a legume?

c. The formation of soil. Classification.

Residual soil (lies where formed).

Mineral (weathered rock); muck (accumulated vegetation).

Transported soil.

Alluvial (stream laid); marine or coastal (ocean laid); lacustrine (lake laid);

glacial (carried by ice and glacial streams); aeolian (wind borne).

3. Meaning and use of "Soil Surveys".

## ACTIVITIES.

1. Trips. (Take notes for purposes of record.)

To a fresh excavation or deep road cut to study the definite layers, — the soil profile.

To collect samples of different kinds of soil.

To gardens and fields to study the type, texture, and depth of soil, and animal life in it.

To see how many of the types of soil as generally classified are found in the surrounding locality.

To note the kind and amount of vegetation found in each type of soil.

2. Experiments. Keep dated records.

To find productivity of different soils, plant seeds in them.

To find water holding powers of each type of soil.

To find that soil contains air.

To note rapidity with which water will rise in each soil.

3. Study soil.

Examine different soils, including samples from school garden, under strong magnifying glass or microscope.

Test for acidity, using litmus paper and small samples of damp soil.

See how many tiny living things can be found in a section of soil. Place the sample on a white sheet.

With spade or soil auger determine the depth of the topsoil.

Note if it is the same in all parts of the garden or field.

4. Writing, reading, and talking activities.

Write the University of Massachusetts for a soil survey report of your county. Study this for descriptions of the principal soils, and the extent and distribution of the various soil types.

Make a collection of pamphlets, illustrative materials, and books dealing with the subject of soils. (See Bibliography)

Committees work and share findings.

Prepare pamphlets on local soils, illustrated with drawings, maps, photographs, diagrams, tables, and graphs.

5. Visual activities.

Show and discuss motion pictures, film strips, and slides.

Build a series of diorama boxes using living material to depict the "Origin of Soil"



from the beginning of solid bare rock through weathering, first forms of life (pioneer plants, the lichens), to fruitful forest and farmland.

Set up an exhibit. Include samples of different local soils, photographs taken in the field, survey maps (authentic), soil profiles (made by children), dioramas, collected pictures, experiments, summaries of experiments, records of trips, reports of reading.

#### BIBLIOGRAPHY.

American Forestry Association. Send for list of publications.

Any of the various series of science readers.

Basic Science Education Series. SOIL. PLANT FACTORIES.

SOIL, WATER, AND MAN. Row, Peterson & Co. (Send for list of publications.)

Bennett, H. H., and Pryor, William C. THIS LAND WE DEFEND.

Longmans, Green & Co.

Boer, Morison E. PANDORA'S BOX, THE STORY OF CONSERVATION.

Farrar and Rinehart Co.

CANADIAN NATURE. 177 Jarvis St., Toronto 2, Canada.

CONSERVATION ILLUSTRATED—Canadian Nature Magazine. 177 Jarvis St., Toronto 2, Canada. \$(1.00 — Excellent).

Goer, Joseph. MEN AND TREES. Harcourt, Brace & Co.

NATURE MAGAZINE. American Nature Association, Washington, D. C.

NATIONAL WILDLIFE FEDERATION, INC. Four Booklets. Send for list.

Pack, Charles L. THE FORESTRY PRIMER. American Tree Association.

Pack and Gill. FOREST FACTS FOR SCHOOLS.

Pryor, William C. and Pryor, Helen S. WATER, HEALTH OR WASTE.

Harcourt, Brace & Co.

University of Massachusetts, Amherst, Mass.

Tippett. PATHS TO CONSERVATION.

United States Department of Agriculture — Soil Conservation Service: pamphlets, booklets, maps, pictures, mimeographed material, bibliographies including available visual aids.

Unit Study Books. American Education Press. SOIL: SOURCES AND USES. WATER: SOURCES AND USES. CONSERVATION OF SOIL AND WATER. Send for list of publications.

### GRADE 5. UNIT VI: GARDENS—TAME OR WILD

#### TOPIC: SPRING FLOWERS. (June)

#### UNDERSTANDINGS.

- All seed-bearing plants are divided into two classes:  
Plants with primitive flower parts, bearing naked seeds; such as the conifers, called Gymnosperms.  
Plants with more specialized flower parts, bearing covered seeds enclosed in an ovary or fruit, called Angiosperms.
- Angiosperms are sub-divided into two groups:

Plants with one seed-leaf, cotyledon, parallel veins, scattered vascular bundles, and flower parts usually in 3's or 6's, called "Monocots".

Plants with two seed-leaves, generally netted veins, vascular bundles in a ring, and flower parts usually in 4's or 5's, called "Dicots".

3. Flowering plants are classified according to flower structures, including number, position, and shape of floral parts.
4. The flower parts are
  - Sepals, which when united are called a calyx.
  - Petals, which when united are called a corolla.
  - Pistil, including stigma and style.
  - Stamens, including anther and filament, and carrying the pollen.
  - Ovary, where the seeds develop.
5. Those plants which most closely resemble each other in flower structure are known as species, of the same genus. Genera closely resembling each other are grouped as families. Families of similar characteristics are considered orders. Orders are the sub-divisions of the Monocots and Dicots.
6. The scientific name of a plant is usually in two parts; the generic name is first and capitalized, and the species name is second and not capitalized. Occasionally a sub-species is indicated by a third name.
7. Color and fragrance of petals attract insects for pollinization. Fragrance is particularly important to the night blooming flowers, which are usually white, and which are often pollinated by night-flying moths.
8. Occasionally sepals and petals are very similar, as in the tulips,—the three outer colored portions of the flower being sepals, the three inner portions being petals. Many lilies follow the same pattern.
9. The modification or development of leaves to petals is apparent in such flowers as poinsettias and flowering dogwood.
10. Modification of petals to stamens is apparent in the water lily.

#### SUGGESTED APPROACHES.

Any flower might be brought in to open discussion of how a flower is properly described.

Several closely related flowers from a spring bouquet might be selected for display and labeled with a leading question such as "Can you tell why these flowers have the same family name?"

Pictures of flowers might be arranged and displayed in the same way.

#### ACTIVITIES.

1. Take a field trip to observe and examine as many diverse types of flowers as possible, either wild or in city parks or gardens.
2. Collect specimens, after reviewing collecting suggestions, for sketching floral parts, or to add to school collection.
3. Make posters showing various types of flower parts.
4. Review regulations for staging flower show, and plan spring flower show. Include some exhibits to illustrate relationship in flowers, and some exhibits to emphasize "Monocots" and "Dicots".
5. Take flowers collected in Grade 4 and start classification for school collection.

6. Prepare simple flower guide for school science room.
7. Observe and record insect activity around various flowers, noting particularly the kinds of flowers visited by one kind of insect.  
It is recommended that flowers with prominent floral parts be selected for special study to minimize the need for dissection.

#### BIBLIOGRAPHY.

- Platt, Rutherford. THIS GREEN WORLD. New York: Dodd, Mead & Co., 1943.  
THIS FLOWERING WORLD. New York: Dodd, Mead & Co., 1947.
- Hylander, C. THE WORLD OF PLANT LIFE. New York: Macmillan Publishing Co., 1944.
- The Basic Science Education Series. PLANT WORLD. Evanston, Illinois: Row, Peterson & Co.

### **GRADE 5. UNIT VII: GIANTS OF THE PLANT WORLD.**

#### **TOPIC: LIFE HISTORIES OF SELECTED TREE FAMILIES. (November)**

#### UNDERSTANDINGS.

1. Trees differ from other types of plants because they have an erect, woody, main stem, or trunk.
2. They come from seeds, as do many other plants; have roots, stems, leaves, flowers, and fruits with seeds.
3. They manufacture their own food from raw materials.
4. Some trees stay green all winter and others lose their leaves.
5. Trees prepare for winter by storing food.
6. Some kinds of trees never grow very large (flowering dogwood); some become old in a comparatively few years (grey birch).
7. Many trees become giants because they live and grow a very long time. The redwoods of our Pacific coastal area are the largest and oldest of living things. Other trees may live a number of years but remain tiny because of unfavorable growing conditions (willow near timberline on a mountain).
8. Some kinds of trees grow under a wide range of conditions. Other trees are restricted by temperature, moisture, soil conditions, and other factors.
9. Trees that grow naturally in an area and have not been introduced by man are called "native trees". Trees brought into an area by man are called "introduced trees".
10. Forests have been a great source of wealth to our people.
11. Practically all of the large forests have been cut off.
12. Forests are a renewable natural resource. We should follow a careful plan of cutting, replacing, and removing them.

#### SUGGESTED APPROACHES.

Pictures, stories, poems or songs about trees are placed on the bulletin board.

Specimens of wood and forest products, food products, cloth, or paper made from trees are displayed on science table.

Recall diary of adopted tree or map of school yard trees made in Grade 4.

A visit to a museum or lumberyard initiates discussion of the kinds and types of woods and wood products.

## ACTIVITIES.

**Fall.**

1. Visit a park or forest. Some trees may belong to the same groups or genera as those already observed in the schoolyard.

a. Collect samples of leaves, fruits, and twigs for future study.

b. Compare temperature, soil, plant and animal life, in the forest and nearby open areas. How does the forest influence the following?

Weather: temperature, moisture, wind.

Soil: depth of top soil, richness and moisture.

Animal life: effect on you. Look for life or signs of life in the air, on and in plants, on and in the earth. Note the kinds and numbers of birds, insects, mammals and others. Why are they here?

Plant life: make similar observations. Note shade and moisture loving plants such as mosses, ferns, and fungi.

Observe that, in young stands, some kinds of trees predominate because there were more seedlings (maple, pine) or because one kind grows faster than another (maple faster than pine).

Count the annual rings of a tree stump. Reckon when the tree began growing, how long it lived before it reached suitable size for lumber. Note also the variation in the annual growth due to weather and other conditions.

2. While the leaves are still soft and moist, lay them between sheets of paper with a weight over them to keep them flat. These leaves may be used in many ways later.

**Winter.**

1. Collect information about trees from reference books, articles, and observations. Mount and exhibit specimens and pictures.

2. Record the following data.

Tree—Where is it generally found? In open or crowded, shaded or sunny, moist or dry situations? In rich or poor soil?

Flower—blooming time, looks, structure, and pollination.

Seed—Appearance, season of ripening, length of time to mature, dispersal, term of viability and conditions necessary for germination; e.g., white oak matures in one year, black-rock requires two.

How does it help animals? How does it help man?

3. Sketch leaf, fruit, bark, and tree shape of some of the following:

a. Conifers.

Pine (white, pitch, red, Scotch, Jack); hemlock; red spruce; cedar.

b. Broadleaf-trees.

Oaks (white, swamp, bur, post, black, red, scarlet, pin, and scrub); maple (sugar, red, Norway); nut (shellbark hickory, butternut); elm; white ash; beech; birch (black, gray, yellow, white or paper); cherry (choke, pin, black); basswood; poplar (quaking aspen, large-toothed aspen, Lombardy, Carolina, silver); willow (golden, weeping).

4. Draw a local map of native trees.

Select a natural planting with variety in the slope of land, soil type, moisture, and exposure. An area twenty or thirty feet across may be large enough if there is variation in topography and several kinds of trees.

Draw a map to scale. Indicate directions, water, elevations, and outcropping of rocks. Signs or color may be used to indicate contours and water.

Mark location of trees. Use numbered or colored circles or colored pins to indicate the kind of tree.

Place a legend at the base of map explaining symbols.

Note which trees prefer the dry, sunny slopes, which have wet feet, and so forth.

5. Prepare crayon, ink prints, or sketches of leaves or specimens. Arrange according to relationship. Mount and label. Write a short life history of each tree.

6. Establish a tree nursery.

Collect cones or seeds of available trees. Most seeds need a rest period before they will germinate. Test by the Rag Doll method. Wet paper toweling. Lay at least ten seeds on it. Label. Roll up the paper. Keep in a warm place where it will not dry out. Carefully examine seeds each day for about ten days. If the samples germinate, the seeds are ready to plant. If the seeds do not germinate, leave them out of doors over the winter and plant them in the springtime.

Prepare soil in cans, pots, or flats. Use coarse gravel at bottom. Fill with a mixture of sand and humus. Plant seeds rather shallow. Cover with leaf mold (humus) or paper to conserve the moisture. Place in a warm place. Do not allow the soil to become dry or waterlogged.

Plant in soil or water fresh stem cuttings of willow. Select young growing wood. Roots and leaves will develop from the small dormant buds on the stems.

Transplant seedlings and cuttings when conditions are suitable, to a nursery. After a year or two, the trees will be large enough to move to a permanent location.

Transplanting. The tiny root-hairs are very important to the well-being of a plant. Soil moisture is absorbed through these hairs. Before transplanting, see that the soil around the plant is wet, then carefully loosen it, and lift soil and plant carefully to the new location. Press the earth gently but firmly about the plant, and water.

BIBLIOGRAPHY. See General Bibliography.

## **GRADE 5. UNIT VII: GIANTS OF THE PLANT WORLD.**

**TOPIC: REFORESTATION; TOWN FORESTS; PLANTING TREES. (April)**

### **UNDERSTANDINGS.**

1. The relationship of trees to peoples is told by history. The destruction of forests was followed by the decline in property and civilization of areas such as the Middle-East, China, and central Mexico. This shows that forest survival is an age-old problem, important to the well-being of a people, and vital to all of us.

2. Forest maintenance has been recognized in central Europe as an important project. There, town-owned (or state-owned) forests (the Black Forest and others) have been successfully and carefully managed for hundreds of years. They have great recreational value, and the income from one sometimes pays all of a town's expense.

3. A study of the forestry situation in this country deals with the original forests; rate of decline and natural replacement; future outlook; national, state, town, and private ownership.

4. Trees and forests are valuable because they serve the following important purposes:

Opportunities for aesthetic and recreational enjoyment.

Wildlife shelter and food.

Temperature and humidity control.

Soil and water conservation through maintenance of soil and sub-soil moisture and its influence on ponds and streams, soil building, erosion and flood control, protection of watersheds and exposed slopes.

Reclamation of poor land (as in reforestation of run-out farm land) and the resulting increase in land value.

Source of income: rental, lumber, pulp wood, cord wood, Christmas trees, increased tax value; and hunting and fishing license sale.

5. Forests have declined for the following reasons:  
undesirable land usage; careless and greedy lumbering; fire; introduction of disease or insects.

6. Constructive practices call for the following:

Careful selection of site and of species, suitability of each; planned use.

Best cultural methods to be practiced in planting, thinning, pruning, selective cutting in woodlots, disease and insect control, and care for possible effect of dusting and spraying on wildlife.

Wise method of financing, with help available from Federal Government (U.S.D.A. Production and Marketing Administration), from the state (possible free or low cost trees) and from other sources.

Consultation with a reliable forester, your State Extension Service, State Forest Commissioner, Massachusetts Forest and Parks Association, or U.S.D.A. Soil Conservation Service.

#### ACTIVITIES.

Children may work out, through study, consultation, and observation, plans for a town forest. They may actually plant, study, or tend some tree (of course with proper permission) on town property, in the playground, or in a back yard.

#### BIBLIOGRAPHY.

- Edge, Rosalie. OUR NATION'S FORESTS. New York: Emergency Conservation Committee, Publ. 73, 1938.
- Harvard University. THE HARVARD FOREST MODELS. Cornwall, New York: Cornwall Press, Inc., 1941. Illustrated.
- Peterson, R. T. AUDUBON TEACHERS GUIDE. Chapter 6. New York: National Audubon Society, 1000 Fifth Avenue. 1947.
- Reynolds, H. A. THE RUSSELL TOWN FOREST. Boston: Massachusetts Forest and Park Association, 3 Joy Street. Bul. 170.

### GRADE 5. UNIT VIII: BIRDS.

#### TOPIC: A STUDY OF BIRDS OF PREY. (December)

#### UNDERSTANDINGS.

1. Birds of prey, or predatory birds, are meat-eating animals. These include the hawks, owls, and shrikes. Crows and blue jays also eat young birds and eggs occasionally.
2. We ourselves are meat-eaters. A hawk kills a sparrow or rabbit; we eat chicken or beef. Is there any reason why jays or crows, semi-predators, should not eat eggs if we do so?
3. Careful investigation has shown that hawks are among our most beneficial birds; 85% of their food is rodents and insects, in whose control they greatly aid man. Besides this, hawks are among the most beautiful and spectacular of birds, graceful in flight, courageous, and with remarkable eyesight.

4. Large, broad-winged hawks, known as *buteos*, that soar above fields and farms, are usually looking for mice and rats, which feed on the farmer's grain and plants. Instead of "Chicken" or "Hen" Hawks, these predators could more truly be called "Mouse" Hawks.

5. Three quick-darting hawks, known as *accipiters*, take birds as well as some rodents and insects. However, the birds caught are apt to be weak and diseased, and this is Nature's way of weeding out the unfit.

6. The fastest flying hawks, known as *falcons*, have narrow pointed wings. Best known is the sparrow hawk, which from its food habits should be known as the "Grasshopper Hawk".

7. Two hawks, the Bald Eagle and the Osprey, prefer fish for their food. The fish eaten are usually not those preferred by man. Both these hawks are protected by law.

8. Hawks are worth protecting for their beauty in flight, as well as for their usefulness.

9. "Owls are the most beneficial of all birds, inflicting little damage...and...conferring vast benefits upon the farmer." (Statement from the U. S. Department of Agriculture.)

10. Only the Great Horned Owl is considered harmful enough so it is not on the protected bird list. In the wilderness this owl aids in keeping the balance of nature; on the farm or game preserve it may need to be controlled.

11. Some predators, such as eagles, turkey vultures, and the crow, act as scavengers; they are our wild life health officers.

12. These predators, the hawks and owls, need in rare instances to be controlled, but they must not and should not be exterminated.

#### SUGGESTED APPROACHES.

Read the story of famed Hawk Mountain. (Write for booklet to Maurice Braun, Director, Hawk Mountain Sanctuary, Dreherstown, Pa.)

Send for School Nature League Bulletins to National Audubon Society, 1000 Fifth Avenue, New York City.

Series #17, Bulletin 3, STORIES OF OWLS

Series #18, Bulletin 4, OUR FRIENDS THE HAWKS

Post pictures of hawks, with questions about the speed of their flight. Compare with speed of airplanes.

#### ACTIVITIES.

1. Outlines cut from cardboard may be made from enlarged drawings taken from Peterson's FIELD GUIDE TO BIRDS. These should be hung overhead in the schoolroom to familiarize pupils with the different types as seen in flight. Thus the true bird-hawks, the *accipiters*, may be distinguished from more beneficial species.

2. Discuss relation of shape to flight in these three types.

3. Make a poster showing the four owls most often noticed in the state, distinguishing them thus:

Great Horned Owl: much larger than crow; yellow-brown coloration, prominent ear tufts, fierce yellow eyes. Deep hoots in 3's or 5's.

Barred Owl: also much larger than crow; gray-brown in color, no ear tufts, dark eyes. Hoots in 4's or 8's.

Screech Owl: smaller than crow; either bark-gray or fox-red in color, ear tufts; does not hoot; a long, wailing call, usually descending in pitch toward end.

Snowy Owl: This large, white owl from the Arctic is fairly common during some winters. Female and immature have dark spots on the white background.

4. Take a trip to a nearby museum to see mounted hawks and owls, arrangement previously made for museum staff member to guide the class.
5. Take a trip to a hill or mountain top during migration periods. Consult nearest bird club for dates, localities, and favorable winds.
6. Send stories or articles to local newspapers telling of the good the hawks and owls accomplish.
7. Make posters, which might be exhibited in the schools, libraries, and stores, with subjects such as
  - a. Food cycle, showing "hawk eats mouse which eats grain".
  - b. Owl eating rabbit which girdles bark in winter and thus kills fruit trees.
  - c. Shrike feeding on grasshoppers which destroy much grass and hay.
  - d. Farmer kills "chicken hawk" seen over chicken yard, and on picking up body finds it has a large rat in talons.
  - e. "What the Red-Tail Hawk (or Barred Owl, or Sparrow Hawk) Eats" (with help from Junior Audubon Leaflet 136, from National Audubon Society.)

#### BIBLIOGRAPHY.

- Braun, Maurice. HAWKS ALOFT. New York: Dodd, Mead and Co.
- May, John B. HAWKS OF NORTH AMERICA. New York: National Audubon Society.

#### GRADE 5. UNIT VIII: BIRDS.

##### TOPIC: NESTING BIRDS. (May)

##### UNDERSTANDINGS.

1. Each species of bird builds a very characteristic nest.
2. Material used in building nests is usually found near the site.
3. Some birds build no nest but lay eggs in the nest of other birds.
4. Nests are usually located close to the source of food.
5. Birds establish claims to nesting sites and allow no other bird of the same species in that territory.
6. Nests are built for a place in which to lay eggs and raise young.
7. Most birds do not use the nest after the young have gone.
8. Some birds use the nest built by another bird.
9. Most birds have some method of concealing the nest.
10. Birds hatch from eggs and are cared for by the parents or ones acting as parents until the young can care for themselves.
11. Birds have certain adaptations: beak, feet, tail, and wings, which fit them for life in a particular environment and for a particular way of life.
12. Some birds have a different mate every year; some birds change mates during the nesting season; some birds remain together for a longer period, sometimes for life.
13. In some species both the male and female build the nest; in others only the female.
14. In some species both the male and female incubate the eggs.
15. Birds are kept very busy feeding the young.
16. Cats should be kept indoors at night, as usually nestlings leave the nest in the early morning hours.
17. We should protect an occupied nest.



18. The female bird usually has concealing coloration and markings.
19. The young usually resemble the female more than the male, and often have markings which later are lost.
20. Most birds are good housekeepers, keeping the nests clean of all waste matter.
21. Field guides are a help in the identification of birds' nests as well as the birds themselves.
22. It is both wise and fun to provide nesting sites for birds near your home.

#### SUGGESTED APPROACHES.

A nesting bird is discovered.

A bird is seen collecting twigs, mud, or other materials.

A movie showing nesting birds is shown the class.

The children recall the fall activity: the collecting of nests and making of habitat boxes.

#### ACTIVITIES.

##### Fall.

1. Trips into the field to find and to collect nests. Note: collect nests in the fall and winter months only after the birds have finished using them.  
Note type of habitat; tree, bush, or other location; height above ground; how attached, if at all, to the support.
2. Classroom activities with nests collected.  
Examine the nest and list materials used; identify, using key; make habitat boxes; write data needed to make the collection valuable, including the field notes.
3. Build bird boxes and nesting platforms.

##### Spring.

1. Trips into the field to find nesting birds (April to June).  
Locate nests. Watch and listen for singing males; parent approaching nest; behavior of bird indicating alarm.  
Identify bird. Recall work done in Grade 4. Learn how to use Field Guides. Note habitat.  
Are any other nests near? How near? If so, is it the same species?  
Try to observe, without disturbing the birds, which bird incubates eggs, or if both do; coloring of the female bird (why?); coloring of the male bird (why?); feeding of parent and young on nest; number and coloring of eggs; other activities about the nest; e.g., guarding, turning eggs, cleaning the nest.
2. Put out nesting materials, bird boxes, and nesting platforms. (April).
3. If possible, make a small bird sanctuary on or near the school grounds providing the following:  
Bird bath; shrubs and trees, the fruit of which birds eat; nesting boxes and platforms; nesting materials; feeding trays of various types; protection from marauders.
4. Classroom activities connected with outdoor work.
  - a. Discuss our responsibility toward nesting birds we study.
  - b. Write bird bulletins to be distributed to other children and taken home.
  - c. Make a map to scale of the neighborhood and place on it all the nesting birds found or sign of nesting birds. Include kind of bird.
  - d. Keep individual records, or write booklets on nesting birds.
  - e. Keep bird calendars: where bird or nest is seen, when, and interesting observations.

- f. Read interesting material concerning nesting birds.
- g. See colored movies on nesting birds.
- h. Make posters to call people's attention to the need of protecting our birds, especially at nesting time.
- i. Contribute to the School Bird Library.

### **Sharing and Evaluation Activities.**

1. Plan a program where the children share with others their experiences. At the same time they might present to the school something made for the School Bird Library.
2. Give simple tests on facts learned, though appreciations gained are of more value than facts which can be put down on paper.

### **BIBLIOGRAPHY.**

- Allen, Arthur A. *BOOK OF BIRD LIFE.* New York: D. Van Nostrand Co.
- Headstrom, Richard. *WHAT NEST IS THAT?* Boston: Massachusetts Audubon Soc.
- BIRD'S NESTS.* New York: Ives Washburn.

## **GRADE 5. UNIT IX: ROCK AND MINERAL DEPOSITS.**

### **TOPIC: HOW NATURE MANUFACTURES ROCKS. (March)**

#### **UNDERSTANDINGS.**

1. Although sometimes the words are used interchangeably, there is a distinct difference between rocks, minerals, and metals.
2. Rocks are forming and disintegrating continually; one of these processes offsets the other, otherwise life as we know it could not survive.
3. Many of these processes require thousands of years.
4. We should not waste these products that take thousands of years to form.
5. Different combinations of the same material can produce rocks which differ in appearance and use.
6. Rare minerals are valuable.
7. Many rocks are objects of great beauty.
8. Rock formations taught man how to make plaster, cement, and brick.
9. Our modern civilization would not be possible without these rocks and minerals.

#### **Content understandings.**

The following background material forms a suggested framework for the study of rocks. Definitions of the terms used may be found in any geology book for beginners; references are given at the end of this section.

1. Nature makes rocks out of minerals. A mineral is a non-living substance of definite composition usually in the form of a crystal. It is a combination of two or more elements, one of which is usually a metal.
2. Some of the common minerals are quartz, feldspar, mica, calcite, and dolomite.
3. There are three kinds of rocks: sedimentary, igneous, and metamorphic.
4. There are three kinds of sedimentary rocks: quartz rocks; lime rocks; clay rocks. (List and define sub-divisions.)
5. Examples of igneous rocks are lava; granite; trap rock. (Sub-divisions.)
6. Examples of metamorphic rocks are quartzite; quartz schist; slate; marble; gneiss; anthracite coal.

## SUGGESTED APPROACHES.

Rocks or rock formations are noticed, perhaps on some trip or picnic.

Teacher borrows or secures through the School Department a labeled collection of common rocks and minerals. (These can be purchased from any science supply house.)

In the study of soil, or natural resources (perhaps in Social Studies), the subject of rocks and minerals becomes interesting.

## ACTIVITIES.

1. Individual students or class may make collections of rocks which are found locally.
2. Illustrate by collections of a different type the changing of one type of rock into another.
3. Collect pictures of well known landmarks and rock formations in various parts of the world, and take pictures locally.
4. Make charts showing main types of rocks and their sub-divisions.
5. Class or committee may visit local library to collect books on rocks and minerals, and may set up library in classroom.
6. Take trip to Natural History Museum, and field trips to quarries, gravel and sand pits, to see how rocks are formed.
7. Inspect buildings and visit roads under construction to see type of stone used.
8. Visit a jeweler to see minerals that are valuable and beautiful.
9. Manufacture artificial rocks in class. (Plaster, cement, and plaster of paris.)
10. Write to Department of Mines, Washington, and ask for free booklets.
11. Keep records of work done and information gained by pamphlets, charts, diaries, photographs, and maps.

## BIBLIOGRAPHY.

Berryman, Williman. AN INTRODUCTION TO GEOLOGY. Vol. I. New York: Macmillan Co.

Jean, Harrah and Herman. MAN AND THE NATURE OF HIS PHYSICAL UNIVERSE. Boston: Ginn and Co.

Norton, William Harmon. ELEMENTS OF GEOLOGY. Boston: Ginn and Co.

Shaler, N. S. FIRST BOOK IN GEOLOGY. Boston: D. C. Heath & Co.

"Rocks and Minerals", Cornell Rural School Leaflet Vol. 21, January, 1928, Number 3, Cornell University, Ithaca, New York.

"U. S. Minerals and Us." Cornell Rural School Leaflet, Vol. 35, Number 4, Cornell University, Ithaca, New York.

## GRADE 5. UNIT X: WATER AND RAINFALL.

### TOPIC: AVERAGE RAINFALL AND LOCAL WATER SUPPLY. (January)

#### UNDERSTANDINGS.

1. Although enough rain falls on the United States each year to cover the country to a depth of 2-1/2 feet of water, the amount of rainfall varies greatly over the length and breadth of the country. An example of heavy rainfall is in the Pacific Northwest and parts of Florida with over 60 inches per year. An example of light rainfall is in parts of Nevada, Arizona, and Southern

California with less than 10 inches per year. The average rainfall in Massachusetts is over 40 inches per year, well distributed through the months.

2. Three-fifths of the earth's surface is covered by oceans. These are great reservoirs for water.

3. The amount of rainfall, in large part at least, determines the type and luxuriance of the plant life.

4. Water evaporates from oceans, lakes, ponds, rivers, and even the ground, to form clouds which eventually drop their moisture in the form of rain or snow. Plants add to all this by giving off unbelievably large amounts of water through a process known as transpiration.

5. After falling, rain soaks into the ground, runs off, or evaporates.

6. Water, which soaks down below the soil into the subsoil and to baserock, accumulates as an underground reservoir; and the top of this layer of water is known as the water table.

7. The water table in some places is very near the surface. In other places it may be far below the surface.

8. The water table of a given region does not stay at the same level all the time. Its level depends on the amount of rainfall and also on the amount of rain that has a chance to soak into the ground.

9. When mountainsides are covered with forests, and the forest floor is covered with a spongy humus of decayed leaves, the rainfall reaches the streams very gradually, and much of it has a chance to soak in.

10. When mountains and hillsides are cut over or burned over, the run-off of rain is very rapid. Very little water soaks in. Water gains momentum as it reaches lower levels and is joined by more water from other streams. Even large rocks are moved along, stream banks are cut away, and flood waters strip rich farm lands of their soil.

11. The water table in Massachusetts has receded at an alarming rate in the last century, emphasizing the necessity of water conservation.

12. When it is necessary for man to grow crops, run-off can be slowed down by contour plowing, — planting crops in level rows around the sides of the hills instead of up and down the hills. If the farmer also tries strip-cropping in addition, there will be even greater saving of soil. Here strips of cultivated crops such as corn are alternated with a non-cultivated crop of a much denser growth such as clover or alfalfa.

13. All forms of living things benefit by reducing run-off to a minimum. Plants have more soil to live on, the water table is kept high, preventing drought and dry wells and springs; even the fish benefit, having clear streams in which to live instead of streams clogged with silt.

14. Ten inches of average snowfall equals one inch of rain.

#### SUGGESTED APPROACHES.

Local conditions of drought, flood, the construction of a new reservoir, or the drilling of an artesian well.

A showing of the film "The River" (16 mm. sound), available through the National Emergency Council, Commercial National Bank Building, Washington, D.C.

Reading from "Rich Land, Poor Land" by Stuart Chase; from "Water, Life Blood of the Earth" by Roger T. Peterson, a pamphlet available through the National Audubon Society; and from "Nature's Bank, the Soil", a pamphlet issued by National Wildlife Federation, Washington, D.C.

A well goes dry, necessitating the hauling of water.

## ACTIVITIES.

1. Find out the meaning of "Water Cycle" and make a pictorial chart.
2. Study the average rainfall over the United States with particular attention to Massachusetts, and make a map.
3. Visit an area where erosion has washed away the topsoil, causing gullies.
4. Visit a local stream or river. Is the water clear? Are there any fish in it? What other forms of life? If it is dirty or polluted, what is the cause? What could be done to make the water clear?
5. Make a collection of pictures and newspaper clippings which tell the story of man's failure to handle his water resources properly. Also get pictures to show man's action to remedy his mistakes.
6. Make a soil erosion exhibit which will contrast the effects of a hillside covered with vegetation and one which has been stripped of it through man's carelessness.

## BIBLIOGRAPHY.

Gufstafson, A. F. CONSERVATION IN THE UNITED STATES. Ithaca, New York: Comstock Publishing Co.

————— RAINDROPS AND MUDDY WATER. Washington, D.C.: National Wildlife Federation.

Write: United States Department of Agriculture, Soil Conservation Service, Regional Office, Amherst, Mass., for Bibliographies and Lists of Visual Aids.

See also units on Conservation in the Social Studies section of this Guide.

**GRADE 5. UNIT XI: STARS AND PLANETS.****TOPIC: EARTH'S NEIGHBORS VISIBLE IN THE WINTER SKY. (February)**

## UNDERSTANDINGS.

1. We are but a very small part of our solar system.
2. There are nine planets revolving about our sun.
3. A planisphere is a device which helps us locate the heavenly bodies.
4. A constellation is a group of stars which make an imaginary picture in the sky.
5. The north star and the constellation which revolves about it are visible to us in the northern hemisphere on clear nights throughout the year.
6. The revolution of the earth about the sun causes our seasons.
7. The rotation of the earth on its axis causes day and night.
8. Stars shine by their own light; i.e., are the source of light.
9. Planets shine because they reflect light from the sun.
10. Our sun is a star, but it looks larger and makes other stars invisible to us in the day time because it is nearer to us.
11. Other stars are so far away we get but little light from them.
12. When the earth passes between the sun and the moon we get a lunar eclipse. When the moon passes between the sun and the earth we get an eclipse of the sun.
13. Our ideas about the vastness of space are changing rapidly, through the discoveries being made by means of powerful telescopes now in use.
14. The study of the heavenly bodies is one of the oldest fields of scientific study.

15. Knowledge of how to read direction and time by means of the stars was essential to the early mariner.

16. Light travels about 186,000 miles per second. A "light year" is the distance light travels in one year.

#### SUGGESTED APPROACHES.

An eclipse, a meteor shower or "falling star", or the moon observed clearly in the day time.  
Ancient myths about the stars and constellations.

Radio program or story featuring an astrologer. Question, "What is the difference between an astrologer and an astronomer?"

#### ACTIVITIES.

1. Through an early evening trip (or through discussion) discover what the children already know and what misconceptions they have. List questions, misconceptions, and needed terminology and names.

2. Learn to use a simple planisphere.

3. Study accurate blackboard charts of some of the commoner constellations. Have children look for constellations then visible and report findings.

4. Make sky maps of what is found.

Ursa Major, Ursa Minor, and Polaris should be studied and charted first. After the children are very familiar with these, the following or any others might be taken, sky maps or charts being made for each: Cassiopeia; Orion; Pleiades; The Dragon; Square or Pegasus; The Sickle.

Notice that the constellations visible, and their position, depend upon the time of year.

5. Become acquainted with the important stars. Locate them on a map after they have been located in the heavens.

Polaris should be found. Show how the "pointer" stars of the Big Dipper will help locate this star. How can direction be determined when you know the Pole Star?

Other stars may be found, including Capella; The Heavenly Twins, Pollux and Castor; The Great Dog Star, Sirius; Regulus.

6. Locate the planets. Place them on the sky maps or charts.

7. Make small ball or bead models to show the relative position of the nine planets to our sun. Indicate in some way the distance of each from the sun and from each other.

8. Study the moon and its relation to the earth.

Make small ball or bead model of the earth and the moon.

Observe phases of the moon. From bright paper cut shapes to represent each phase and put it on a chart of the sky. Compare with calendar or almanac.

Show the relation of the moon to the tides.

Demonstrate what causes an eclipse of the moon with light and balls.

Demonstrate how we see only one side of the moon.

9. Study night and day.

Demonstrate with ball or globe and a bright light why we have night and day. Note that the globe rotates counter clockwise.

Build up a human model of sun, earth, and moon by easy stages. (1) Sun stands in the center of a large clear area, while Earth walks around him in a circle. This is one year. (2) Earth stands in place, but rotates once. This is one day. (3) Earth combines two motions, both counter clockwise. (4) Moon shows passage of one month around earth. (5) Lastly, slowly, try all together.

10. Study our sun.  
 Note in which sky we see the sun.  
 Note where the sun is noon Sept. 21st, Dec. 21st, March 21st, and June 21st. Keep a record.  
 Make a shadow stick and note the path of the sun one day a month at half-hour intervals.  
 If the class is capable, make a sun dial.  
 Find out, demonstrate, and diagram the relation of sun and earth at the different seasons.  
 Demonstrate why it is warmer in summer.
11. Study comets and meteors if children are interested.
12. Develop the meaning of "light year".  
 Multiply 186,000 (miles per second rate light travels) by 60, by 60 again, by 24, by 365.  
 Explain distance of stars by some such statement as "the light we get from the Pleiades started on its journey before America was discovered."
13. Show a true scale picture of earth, moon, and sun at least once. Make a 3-inch circle, and on a separate piece of paper try to make 1/32 inch dot. Hold a sun and an earth 27 feet apart. Point out that the moon would be an inch away from the earth and only 1/4 as large.
14. In other interesting activities children may develop such topics as the following:  
 History of astronomy; myths.  
 Telescopes and their use at the large observatories.  
 How the stars helped the ancient mariners.  
 The harm done by astrologers.  
 How can the heavenly bodies help us if we got lost?  
 Making a sky clock  
 Making an umbrella planetarium.
15. After the study of the stars, planets, and constellations is completed, a summary of learnings may be made with plans for sharing. Hang up a large sheet or stretch on a frame. Children with flash lights stand behind the screen. The lecturer with a light stands at the side. As he tells his story he makes the stars "come out" by holding this lighted flash light in front at the different spots. At the same time the lights behind the screen come on until the desired group of stars shine out on the screen.

#### BIBLIOGRAPHY.

- Comstock, Anna B. HANDBOOK OF NATURE STUDY. Comstock Publishing Co.  
 Cornell Rural School Leaflet Vol. 23, No. 3, "The Sky at Night".

#### GRADE 5. UNIT XII: MACHINES.

##### TOPIC: HOW MACHINES HELP MAN TO DO WORK. (February)

##### UNDERSTANDINGS.

1. Machines enable men to perform feats beyond their natural strength, such as lifting heavy weights. They also enable men to apply movement in one direction and cause an object to move in another direction. Ex. A man pulls down on a rope, and a flag moves up the pole.
2. There are six simple types of machine. Any machine, no matter how complicated, is a combination and application of these six simple machines.

3. Friction takes away some of the efficiency of the machine. If friction can be reduced, the efficiency of the machine increases. It is not possible to have a machine with an efficiency of 100%, because friction cannot be wholly eliminated.

### **Outline of Content. The Six Simple Machines.**

#### 1. The Lever.

The lever is a rigid bar. The bar could be an iron pipe, a piece of wood, or anything similar. This bar must rotate about a point known as the fulcrum. There are three types of levers. Fulcrum, effort, and resistance are interchangeable in the applications of the lever.

#### 2. The Wheel and Axle.

The wheel and axle is a machine where a wheel is rigidly attached to an axle so that if one rotates, the other must. For example, on an automobile, when the axle turns, the wheel turns. In the case of a well and bucket, the effort is applied to the handle, which rotates in a circle similar to the rim of a wheel. Thus the application of the wheel and axle to the well enables a heavy bucket of water to be lifted by the application of only a little effort on the handle, which is the rim of the wheel. Another example is the door-knob.

#### 3. The Pulley.

A pulley is a small wheel or wheels through which a rope can be threaded. Combinations of pulleys are used to lift large weights, or enable a man by exerting motion in one direction to move an object in another direction.

#### 4. The Screw.

The screw is a machine in the form of a cylinder around which runs a thread that fits into a corresponding groove in a stationary base. Examples are the jack screw (automobile) and house screw (used to lift house).

#### 5. The Inclined Plane.

If we are unable to lift a barrel from the ground to a platform we might be able to roll the barrel up a board placed in an inclined position against the platform. Any object placed in an inclined position for this purpose is known as an inclined plane. A small effort can move a great weight because the effort is willing to go a longer distance than the resistance.

#### 6. The Wedge.

The wedge is a triangular object the point of which is inserted in an opening to force the material apart. Examples are the nail, pin, needle, knife, ax, wedge.

### SUGGESTED APPROACHES.

A heavy weight needs to be lifted from the floor to the table.

A nail needs to be removed. Why does a claw hammer help?

Observe men at work; on the street, ditch digging, carpentering, cleaning. What tools are they using?

In building we have difficulty in putting in a screw. "Grease" it with soap and try again. Why did it go in more easily?

### ACTIVITIES.

#### 1. Collect toys to demonstrate each device:

- a. jumping jack      lever class 2
- see-saw clown      lever class 1
- tongs in Jack-straws      lever class 3
- b. toy tricycle or automobile      wheel and axle
- c. child's doll clothes line
- d. toy jack



- e. marble game—marbles roll down tower  
toy loading truck  
glider wing
- f. jack knife  
hunter's knife

Label and explain each one. Demonstrate how each works.

2. Find objects in the school room and school grounds which illustrate each tool; e.g., curtain roller (wheel and axle); door (lever: hinge, fulcrum; weight of door, resistance; your pushing, effort); door knob (wheel and axle); window cord (pulley); adjustable desk or chair (screw); thumb tacks (wedge).
3. Find, bring in and/or list objects in the home illustrating each type of tool.
4. Make simple tools or toys illustrating each tool.
5. Make simple machines with Mechano or Erector Sets and set up an exhibit of simple machines with pictures of modern machines.
6. Use or play with simple machines:
  - a. Levers: Lift objects with lever, crack nuts, pick up objects with tweezers.
  - b. Make, or get, pulleys. Set up single, double, three, four, and five rope pulleys. Lift weights with each.
  - c. Make inclined plane. Raise object from floor to table. How do we get up to the second floor? How do automobiles get to the top of steep hills? Play with gliders.
  - d. Pull child or heavy object on a board. Attach wheels and pull again.
  - e. Build, using screws and nails.
7. Visit a small machine shop. Watch men at work. List all the tools being used and how each helped the man.
8. Keep a dictionary of all new words and terms: ex. fulcrum, mechanical advantage.
9. Take a large picture of a more complicated machine, but one familiar to children, (ex. lawn mower), and label all the simple machines that went into the making of the more complicated machine.
10. Make diagrams of how to thread pulleys.
11. Make large charts with pictures and diagrams, of the six simple tools. Label each and give illustrations of how each is used.
12. Collect pictures illustrating the six simple tools. Put in scrapbook arranged in six sections.

## **GRADE 5. UNIT XIII: HEAT. (February)**

### **UNDERSTANDINGS.**

1. There are several kinds of heating devices (application of heat): hot air furnace, steam heat, stove, fireplace, hot water heater, electric heater, solar heater.
2. There are three methods of transporting heat from one place to another.
  - a. Conduction: Heat moving from particle to particle with each particle remaining stationary. Ex., Heat moving from one end of a solid metal rod to the other.
  - b. Convection: Transporting or carrying heat by some medium, such as water or air.
  - c. Radiation: Heat traveling without the benefit of a medium.
3. Hot air rises and cold air sinks. Hot water rises and cold water sinks.
4. A cubic inch of hot water weighs less than a cubic inch of cold water.
5. Heat always flows from the hot to the cold object.

6. When you have two objects of different temperatures, there is always a flow of heat from the hot object to the cold until the temperatures are the same.
7. Matter expands when heated and contracts when cooled. Gases expand the most when heated. Solids expand the least.
8. A thermometer measures the intensity, or degree, of heat, not the amount.
9. There are two temperature scales.
  - a. Centigrade (C) used in scientific work and in foreign countries.
  - b. Fahrenheit (F) used in every day life.
10. On the centigrade thermometer the freezing point of water at sea level is  $0^{\circ}$ . The boiling point at sea level is  $100^{\circ}$  C.
11. On the Fahrenheit thermometer the freezing point of water at sea level is  $32^{\circ}$ . The boiling point at sea level is  $212^{\circ}$  F.
12. The number of degrees between freezing and boiling on the Fahrenheit thermometer is 180, on the centigrade scale 100.
13. To change a Fahrenheit thermometer reading to a centigrade reading subtract 32 from the Fahrenheit reading and multiply by  $5/9$ .
14. To change a centigrade thermometer reading to a Fahrenheit reading multiply the centigrade reading by  $9/5$ , and add 32.
15. Some types of thermometers are those used for weather, clinical measurement of body heat, bath, oven, candy making, incubators, and milk pasteurization.
16. The sun is the source of all heat.
17. Friction produces heat.
18. Ventilation is the bringing about of a movement of air, introducing fresh air from the outside, reducing the amount of water vapor in the room, and removing the heated air.
19. Some substances and colors absorb heat more rapidly than others.

#### SUGGESTED APPROACHES.

A very cold day starts discussion of heating buildings.

The class room gets very warm and the suggestion is made that windows be opened from the top for a few moments.

The school nurse uses a clinical thermometer as she checks the children during inspection.

While pulling out a nail or sawing wood child remarks on how hot the nail or screw got.

Plants in the fernery are burned because the direct rays of the sun hit them through the glass.

#### ACTIVITIES.

1. Each child studies his home and reports on everything that helps heat it. Make a composite list. Find out if there are any other ways of heating homes.
2. Collect pictures and make an illustrated chart, class book, or individual booklet of all the ways of heating buildings.
3. By attaching small tissue paper strips above the radiator or on register find out how warm air acts.
4. Place a thermometer near the ceiling and another directly below near the floor. Do this away from register and radiators. Note the difference in the readings of the two thermometers.

5. Place a cold spoon in hot water. Note whether the spoon gets warm or the water cold. Place two spoons of different materials in hot water. Which one becomes hot first?

6. Make a collection of different types of thermometers. Write a brief paragraph telling about the uses of each.

7. Study the Fahrenheit and the Centigrade thermometers.

a. Note freezing and boiling points of each. Find these through experimentation.

b. Find out where the two types are used.

c. Study the history of the two thermometers; their inventors.

d. Learn how to change a Fahrenheit thermometer reading to Centigrade, and vice versa.

e. Keep two parallel temperature graphs, one of the Fahrenheit thermometer readings and the other of the Centigrade thermometer readings.

8. Read about the sun and how it is the source of all heat, even the heat coming out of the radiators and registers. Depict the story diagrammatically. Ex. A large sun (heat); large ferns, trees; coal; coal dug; fire in furnace; radiator hot (heat). Do the same for oil heater.

9. Have the children find as many examples of heat through friction as they can in a stated time. Make a composite list.

10. Collect pictures of things which use electric current to produce heat.

11. Experiments.

a. Friction.

Experiment with rubbing hands together, fast and slowly, lightly and hard. Which produces more heat?

Sandpaper a board; pull a nail from wood; use saw or drill.

Make a fire drill, or use boy scout fire drill. Note: Great care must be taken when experimenting with fire. Adult should always be present. Something to extinguish fire should always be at hand.

Scuff the feet along the floor or a rug.

Find out what makes a match light.

b. Heat from the sun.

Out of black cardboard cut inch-wide letters, 5 inches high, BLACK; and out of white cardboard cut WHITE. Lay these letters on the snow in the sun. See which melts through the snow the quicker. Discuss what color clothing is best for summer, and which for winter. Why?

Paint one tin can black and another the same size white. Place in the sun and fill to the brim with water. Which can begins to overflow first? With two thermometers test the two cans. Which warms the quicker? What is the connection between the overflowing and the temperature?

Direct the sun's rays through a reading glass to your hand. Notice how quickly you have to pull it away.

c. Heat from electricity.

Touch a lighted electric bulb. Where does the heat come from?

d. The way thermometers work.

Take three bowls. Fill one with very cold water. In the second put lukewarm water. In the third put as hot water as your hand will stand. Put your right hand into the hot water and your left hand into the cold water. After a few moments put your right into the luke-

warm water. Is it hot or cold? Now put your left hand into the lukewarm water. How does it feel now? Feeling is not a true indicator of the degree of heat.

Fill a bottle full of cold colored water. Cork the bottle. Put a small glass tube through a hole in the cork. Heat the bottle. Watch what happens. Cool the bottle and watch.

Heat the empty bottle. Suspend it upside down so the mouth of tube is in some colored water. Watch what happens as the bottle cools.

e. Expansion and contraction.

See Cornell Rural School Leaflet Vol. 28, No. 3, or any book on experimenting with simple materials.

f. Conduction of heat.

Take strips of different metals, wood, glass, cardboard, plastic, or any material you can obtain. Fasten the strips together loosely at one end and spread the other ends apart like a fan. Heat the ends that are together. Place your fingers at the tips of the other ends. Which heat quickest? Which slowest? Arrange in order of from best to poorest conductors. Test again.

Prove the power of different insulations.

Take a metal rod, 1 to 2 feet long, about the size of a pencil. To this rod stick small beeswax balls an equal distance apart. Heat one end of the rod. Time the balls as they drop.

Take cups made of different materials and fill each cup with hot water. Which handles heat fastest?

g. Difference in weight of hot and cold water.

Almost fill an old quart measure with hot water and another with cold water. Which weighs the more? Take the temperature of each. What does this show you?

Fill a bottle with water from melted ice and put the cork in lightly. When the water has become the same as room temperature notice the cork. Is it pushed in tighter or is it pushed out as the temperature rises?

h. How air behaves when heated and cooled.

Take two sticks about one yard long. Fasten a row of tissue paper streamers about six inches long to the stick. On a calm cold day open the window at top and at bottom. Place one stick with the streamers under the top casing of the window. Place the other stick at the bottom of the lower sash. Notice what happens. Hang a thermometer to each stick and note which registers higher.

With candle, lamp chimney, and cardboard partition prove that hot air rises and cold air sinks.

Mix sawdust with water, and heat. Note the currents. This proves that hot water like hot air rises and cold water like cold air sinks.

i. Study and experiment to find out how heat is carried or gets from one spot to another.

#### BIBLIOGRAPHY.

Brem, Peter. SCIENCE EXPERIMENTS FOR CHILDREN. Wisconsin: Kenyon Press.  
Cornell Rural School Leaflet, Vol. 28, No. 3.

Craig, Gerald S. SCIENCE FOR THE ELEMENTARY SCHOOL TEACHER. Boston:  
Ginn & Co.

Hunter, George W., and Whitman, Walter G. DOORWAYS TO SCIENCE. New York:  
American Book Company.

**GRADE 5. UNIT XIV: LIGHT. (January)****UNDERSTANDINGS.**

1. Light comes directly from a source, such as a flame, electric light bulb, sunlight, or any glowing material.
2. Light is reflected to our eyes by an object.
3. The degree of reflection depends upon the color and texture of the object that does the reflecting.
4. Intensity of light can be measured by devices known as light meters.
5. Light will pass through and we can see through transparent material.
6. Light will pass through but we can not see through translucent material.
7. No light will pass through nor can we see through opaque material.
8. Light passing through one unchanged medium travels in a straight line.
9. Light passing from a dense medium to a less dense medium at an angle tends to bend away from the perpendicular.
10. Light passing from a less dense medium to a dense medium at an angle tends to bend toward the perpendicular.
11. The periscope, microscope, opera glass, binoculars, and camera depend on light for their functioning.
12. Light can change to heat. Heat can change to light.
13. Black absorbs light to a greater or lesser degree; e.g., if we could get a totally black object it would absorb all light.
14. White reflects all light; e.g., if we could get a totally white object we could not see it.
15. Light, heat, electrical, ultra-violet, infra red, and radio waves are probably the same type of energy, form, and material, differing only in wave length and frequency. Ex. Light from the sun hits glass in green house, passes through, hits the ground and changes into heat waves. Heat waves are too big to get out through the glass so the green house is heated. Ex. Light hits shingles, changes to heat, heat absorbed through the shingles to the attic. Heat waves are too big to get back so they pile up in the attic.

**SUGGESTED APPROACHES.**

Child reports seeing a house being insulated.

Children's desks are shifted or shades are pulled so light will fall on papers correctly.

A rainbow is observed. A prism is hung in a sunny window.

A highway accident is reported where the object hit was totally black.

An eclipse of the moon or sun is seen.

A child receives a camera for Christmas, or a toy periscope, microscope, telescope, or opera glasses.

**ACTIVITIES.**

1. List everything in the school or home that is luminous, that is, which gives out light.
2. Try to discover what objects in the room reflect the most light.
3. With a light meter measure the intensity of light in various spots in the room. Find out how much light is needed for study. Are we getting enough light? Try to get stronger bulbs in the lights if necessary.

4. Make a collection of transparent, translucent, and opaque objects. Organize under headings.
5. Study what causes the eclipse of the sun and moon. Experiment with balls of different sizes, and a light.
6. Experiment with light to show the following:
  - a. Light usually travels in a straight line.
  - b. Light passes through some objects and is absorbed by others.
  - c. Smooth, highly polished surfaces reflect light; roughened surfaces diffuse the light.
  - d. A mirror can change the path of light.

WARNING: Be extremely careful that the beam of light from the mirror does not strike your eyes or the eyes of anyone else. A person can be made permanently blind by such an accident.

  - e. Reflections vary depending on whether the surface is flat, concave, or convex.
  - f. Effects of refraction.
7. Experiment with a prism and resulting rainbow, noting the order of the colors as the light shines through the different faces of the prism.
8. Make a list of the places where reflected light is used rather than direct light; e.g., danger signs on highways.
9. Study camouflage in nature and the effect of light and shadow on color and form.
10. Make and play with periscope.
11. Make a list of the things that need light for their functioning. Discuss what we would have to do without, if we had no light. Could there be life as we know it without light?

#### BIBLIOGRAPHY.

- Brem, Peter. SCIENCE EXPERIMENTS OF CHILDREN. Milwaukee, Wisconsin: Kenyon Press.
- Craig, Gerald S. SCIENCE FOR THE ELEMENTARY SCHOOL TEACHER. Boston: Ginn and Company.
- Hunter, George W., and Whitman, Walter G. DOORWAYS TO SCIENCE. New York: American Book Co.
- Cornell Rural School Leaflet, Vol. 26, No. 3. Ithaca, New York: Cornell University.

#### GRADE 6. SUMMARY OF YEAR'S WORK.

In the biological sciences in Grade 6, although identification and classification will be continued, these phases of study will be subordinated to the study of the economic value of certain plants and animals in relation to man, and to the meaning and problems of conservation and restoration.

One-third of the science teaching time will be given to work in the physical science field. Topics to be included are chemistry in the home; fire; electricity; air pressure and devices dependent on air pressure; and airplanes, especially the relation of weather to flying.

Some time will be devoted to a study of the lives and works of great scientists.

**GRADE 6. UNIT 1: THE RELATION OF SOME COMMON ANIMALS TO MAN.****TOPIC: A TINY SOIL CONDITIONER. (September)**

## UNDERSTANDINGS.

1. The earthworm is a very simple small animal with no skeleton.
2. It breathes air through its moist skin.
3. In winter, earthworms hibernate in clusters, well below the frost line, to conserve body moisture.
4. Each spring all adult earthworms lay eggs.
5. The earthworm can perceive light and dark, but only the sense of touch is keen.
6. It is omnivorous, eating earth, leaves, flowers, raw meat, fat, and occasionally other earthworms.
7. The earthworm is one of the most valuable of animals, not only to us, but to all living things.
8. The earthworm is considered Nature's greatest gardener, flood preventer, and soil conditioner.
9. The earthworm is a very simple animal, and is not related to caterpillars, which are young insects.

## SUGGESTED APPROACHES.

1. Have children go out to their yards at night with a flashlight and find the earthworm at work in the soil. Ask each child to bring one in, alive in a bit of soil.
2. Note the castings, tiny piles of earth, visible on many school grounds particularly after a rain.
3. After a heavy rain note the earth worms in the road and on the sidewalk.

## ACTIVITIES.

1. Build a school terrarium in glass and stock it with earthworms.  
Scatter fresh grass on top of the earth. Notice its use as food, and as lining for tip of burrow.  
Describe the home of the earthworm. Is a burrow occupied by more than one worm? How long is a burrow? (Usually 12 to 18 inches.)  
Is the worm most active by day or night? Darken the terrarium. Where does it spend the day? (Underneath). When is the tail end on top (day) and when the head? How does it turn?  
Do you find eggs? (Early summer only.)  
What does it use for food? How obtain it?  
Drench terrarium with water. Notice the worms have to come to the surface for air, or drown. Call attention to the number of worms found on the sidewalks and street after a hard rain. This is the source of the old superstition that it "rains worms".
2. Analyze individual earthworm as an animal.  
Find caterpillars and compare.  
Study motion, as worm is propelled by two rows of tiny bristles (setae). Compare to legless snakes, and to caterpillars with their six true legs and many sucker legs.  
Compare the length when it contracts and expands. How does it do this? (Two sets of muscles)  
How long does it take to bury itself?  
Note segments. Do all worms have the same number? Compare head end and tail end.

Notice that the clitellum, egg-forming organ, is on adults only.

Test responses of worm to stimuli. Hear? See? Sensitive to smell? Vibration? Touch? Why is the skin moist? (Breathing)

3. Make a poster comparing the earthworm, caterpillar, and snake as to their structure, reproduction, locomotion, respiration, food, and value to man.
4. Prepare a chart of the earthworm as farmer, showing his activities as plowman, harrower, fertilizer factory, drainage and food control manager, seed planter and cultivator.

#### BIBLIOGRAPHY.

Comstock, Anna B. HANDBOOK TO NATURE STUDY. Ithaca, New York: Comstock Publishing Co.

Moore, Clifford B. THE BOOK OF WILD PETS. New York: G. P. Putnam's Sons.

Magazine — CANADIAN NATURE, March-April, 1947.

### **GRADE 6. UNIT 1: THE RELATION OF SOME COMMON ANIMALS TO MAN.**

#### **TOPIC: THE PLACE OF PREDATORS IN THE WORLD.**

**"G — MEN OF MEADOW, POND, AND FOREST." (November)**

#### UNDERSTANDINGS.

1. A predator is any animal that preys upon other animals.
2. Many animals are entirely predatory: hawks, owls, foxes, snakes, frogs, toads, many fish, wildcats, and shrews.
3. Other animals are predators part of the time: crow, jay, insect-eating birds, skunk, bear, and man.
4. Many insects are predatory upon one another.
5. It is no crime to be a predator.
6. Predators as a whole are very useful to man, both directly and indirectly; they eat animals, such as rats and mice, that conflict with man's interests, and they destroy diseased animals.
7. Many predators rate high in beauty and intelligence and should be preserved if only because of their esthetic interest.
8. The predator's part in maintaining balance in nature is important to man's welfare.

#### SUGGESTED APPROACHES.

Child reports seeing a hawk or shrike catch a small bird or chicken, leading to a discussion of the place of the predator in nature.

Children observe food habits of cat, frog, snake, or praying mantis.

A small tree girdled by mice is shown. What happens when a young tree is girdled is discussed.

#### ACTIVITIES.

1. List the predators in your locality. Find out what they eat.
2. Keep two white mice in the classroom; feed them wheat and oats, and keep track of expense.



3. Read for information concerning the activities and food of predators. See reference list.
4. Visit zoo or natural history museum to see predators.
5. Observe the "G-men" of the ponds; e.g., dragon flies catching insects such as mosquitoes.
6. Hold "court trial" on some predators, rating each A, B, C, or D in reference to the value to man of what he eats.

Example: Red Fox	Largely rabbits and mice	A
	Some fruits and insects	A
	A few game birds	B (many are sick)
	Occasional poultry	D

Average                                            
B Plus

Note the percentage of animals acquitted or found guilty.

7. Figure the number of descendants a pair of robins would have in ten years, if all survived. Allow two broods of four young a year. Do the same problem for mice for one year.
8. Prepare an exhibit on the "Balance of Nature", representing plants, insects, insect eating animals, and other predators and their food.
9. Make posters showing nature in or out of balance. Suggestions:
  - a. Two owls catching rats which are eating grain.  
Two dead owls, 500 rats and empty grain bins.
  - b. A hawk catching a large rat, which has a half eaten chicken in its mouth.
  - c. A man facing his girdled apple trees, and a mouse grinning behind his back.
  - d. Cartoon: Rats, mice, and rabbits as "masked thieves"; predators as "G-Men"; each at work.
10. Plan a school pageant, with children taking parts of animals.
  - Act 1. Shows a happy country scene in balance, with owl, hawk, fox, rabbits, plants, and man.
  - Act 2. Man kills predators, leaving mice, rabbits, and plants.
  - Act 3. Shows fewer farm products, thinner people, and more and more mice, rabbits, and insects.
  - Act 4. Man sees his error. He now protects predators.
  - Act 5. Same as Act 1.

#### BIBLIOGRAPHY.

May, John B. THE HAWKS OF NORTH AMERICA.

##### Bulletins and Leaflets:

Commonwealth of Pennsylvania. "Pennsylvania Birds of Prey." Harrisburg, Pa., 1948.

Emergency Conservation Committee. "Peace at Hawk Mountain Sanctuary."  
"Save Our Hawks. We need Them."

New York: 767 Lexington Avenue, New York 21.

National Audubon Society. "Junior Audubon Leaflet."

"Nature League Bulletins" Series 17, No. 3, Series 18,

No. 4.

**GRADE 6. UNIT II: MARINE AND FRESH WATER LIFE.****TOPICS: A. THE PLACE OF THE SCAVENGER. B. ALGAE. (September)****UNDERSTANDINGS.****A. Scavengers.**

1. A scavenger is an animal which eats dead and decaying animals and plants.
2. Some animals feed almost entirely as scavengers. Other animals may feed partly as scavengers and partly on living material.
3. Scavengers play an important role by cleaning up plant and animal debris. They also serve as a source of food for other members of the community.
4. Scavengers are present in both land and water communities because decaying plants and animals in water use up the limited oxygen supply.
5. In water communities most scavengers feed on the bottom where plant and animal debris accumulates.

**B. Algae.**

1. Algae are simple plants which have no flowers or seeds. Most of them grow in salt or fresh water.
2. Most fresh water algae are microscopic or very small. Many salt water algae are also microscopic but many grow to a very large size.
3. Algae, like other green plants, are able to manufacture their own food.
4. The billions of microscopic algae present in water are very important because they furnish food for tiny animals which in turn furnish food for many larger animals and man.
5. Fresh water "pond scum", slime on rocks and bottom, and mats of slimy green plants are usually algae. Most "pond weeds" are not algae but seed plants.
6. The "seedweeds" found in salt water are true algae. These vary in size, form, and color, and belong to three main groups: the green algae, the red algae, and the brown algae.
7. Many "seedweeds" are of economic importance to man as a source of food, medicines, fertilizer, and other products.

**SUGGESTED APPROACHES.****A. Scavengers.**

A discussion of what happens to dead animals and plants takes place.

The meaning of the word "scavenger" is found after observing a snail displayed in a small jar.

**B. Algae.**

Specimens of algae are brought into class.

A microscope set up with a drop of water containing microscopic life (plants, etc.) shows pictures of life in a drop of water.

**ACTIVITIES.****A. Scavengers.**

1. Visit a fresh water pond or stream to collect animals and plants for an aquarium. Include some scavengers. Snails, tadpoles, small crustaceans, and some kinds of insects will act as scavengers, cleaning up excess food and refuse as well as excess growth of algae. Observe their habits. Do they feed entirely as scavengers? Discuss the place of the scavenger in the balance of the aquarium and of the fresh water community.

2. Make a collection of fresh water scavengers. To do this look for dead plant and animal material on the pond bottom and collect the animals feeding upon it. These will include many small worms and insect larvae as well as snails, crayfish, small crustaceans, and tadpoles. Identify as many as possible and observe their habits.

3. Look up data about common fresh water scavengers. Make a list. Make charts showing the part they play in the community as clean-up squads and as food for other animals.

4. Visit the ocean at low tide to look for marine scavengers. These might include lobsters, crabs, other crustaceans, sea urchins, sand dollars, some marine worms and some snails. Find dead seaweed or animals in the water and see what is feeding on this material.

5. Prepare an exhibit of marine scavengers. Include charts showing the part they play in the ocean community.

6. Study the structures of some common scavengers to see how they are adapted for their way of life.

7. Find out what causes pollution of water environment. How do scavengers help prevent pollution?

8. Visit a lobster hatchery.

## **B. Algae.**

1. Look for algae in a fresh water pond. Scum, mats, and slime are usually caused by algae. If possible find evidence that many of the pond weeds are seed plants. Collect several samples of pond water, including bits of scum, slime, and mud. Place them in glass jars in the schoolroom window and watch. The jars may soon become covered with algae.

2. If possible, examine drops of pond water containing algae through a microscope. Also observe the microscopic animals that feed on the algae. In an established aquarium, algae will have formed on the glass. Scrape, and put what is collected on a slide, covering it with glass. Look at it through the microscope.

3. Find pictures of microscopic algae and of microscopic animals which feed on them. Make charts of food chains showing how animal life in water depends on microscopic algae.

4. Make a trip to the seashore to collect specimens of the larger marine algae or "seaweeds". For directions for successful collecting and mounting, see Bibliography.

5. Arrange an exhibit of the mounted algae specimens. Identify as many as possible by common names (rock weed, sea lettuce, sea moss), and indicate whether they are green, red, or brown algae. The exhibit might also show variety of form and branching, adaptations for water life, and economic uses.

6. Visit local druggist or other store to find out about the different products in which seaweeds are used.

7. Make an exhibit of the above products. These may include foods, medicines, cosmetics, fertilizers, and agar.

## **BIBLIOGRAPHY.**

Arnold, Augusta. SEA BEACH AT EBB TIDE. New York: A. Appleton-Century Co.

Morgan, Ann H. FIELD BOOK OF PONDS AND STREAMS. New York: G. P. Putnam's Sons.

Patch and Fenton. HOLIDAY SHORE. New York: Macmillan Co.

**GRADE 6. UNIT III: PLANT LIFE.****TOPIC: CONSERVE THAT PLANT.**

## UNDERSTANDINGS.

1. Loss of plant cover results in erosion and desert conditions, leading to the ultimate destruction of all animal life; therefore plant cover should be studied, understood, and protected or restored.
2. All animal life is dependent on plant life for food; thus plants hold key position in natural balance.
3. Green plant tissue is the basis of all food.
4. The manufacture of food (photosynthesis) takes place primarily in the green leaf where the raw materials, carbon dioxide ( $\text{CO}_2$ ) and water ( $\text{H}_2\text{O}$ ), are converted into a simple sugar in the presence of sunlight and chlorophyll, the green coloring matter of all plants.
5. Further chemical action converts this simple sugar into more complex sugars, starches, and proteins.
6. Water and minerals are absorbed by the roots only.
7. Carbon dioxide is supplied from the air through the stomata, which are specialized cells on the under side of the leaves.
8. During the process of photosynthesis free oxygen is released to be utilized in the respiration of both plants and animals. Plants thus act as air purifiers.
9. Transpiration, the release of water into the atmosphere, is continuous though retarded in darkness. Plants thus serve as automatic sprinkler systems, temperature stabilizers, and agents of drought reduction.
10. Food is stored in all parts of the plant except in leaves and bark.
11. Plants supply the major portion of humus which is essential to good soil.
12. At present sixteen elements are considered essential to plant growth. The chief elements are supplied by many chemical fertilizers, and potassium, nitrogen, and phosphorus.
13. Many individual plants should be protected for their beauty or rarity.
14. When picking wild flowers, a good rule to observe is to pick one only when there are nine more in sight.

## SUGGESTED APPROACHES.

- Place stalks of celery in red ink to show absorption of liquids.
- Show a piece of cut potato with a drop or two of iodine turning the cells purple, indicating presence of starch.
- Show "before and after" pictures of cut over forest land, swamp drainage project, or restoration.
- Show plant which has been kept in the dark.

## ACTIVITIES.

1. Take a trip to newly constructed road, housing development, or industrial plant to note provision made for new plant cover.
2. Set up experiment to observe effect of light or lack of it on plant growth. Start radish or other quick-growing seeds in a number of small containers. After growth is established, place one pot in a dark location; place one pot where there is warmth but little light, no direct sunlight; place several check pots in full sun. Compare plants daily, keeping record of growth and color of leaves.

Make tissue, medium-weight, and heavy-weight paper bag-like covers and place over individual leaves of a check plant; note and record effects and compare with plants used in above experiment.

Draw conclusions concerning necessity of light in production of chlorophyll, and plant growth.

3. Diagram photosynthesis as a plant factory.

4. Observe and check transportation by watching terrarium for evaporation and condensation, or place a jar over potted plant making a tight joint at top of pot; water plant from bottom, and watch as above.

5. Try a series of seedlings in soil mixtures containing different types of fertilizers (minerals). Keep check pots and compare results.

6. Thoroughly examine humus in a variety of locations: school grounds, home gardens, pocket in a rock ledge, woods, swamp, field, or sand pile. Compare findings.

7. Make up a few food chains, illustrating with pictures, fox-rabbit-clover; mink-pickereel-trout-water plants; man-pork-corn.

8. Make charts or booklets, depicting specific parts of plants used as food; e.g., carrot-thickened root, walnut-seed, peach-seed case, potato-underground stem, lettuce-leaf, cauliflower and broccoli buds, cinnamon-bark.

#### BIBLIOGRAPHY.

Basic Science Education Series. PLANT FACTORIES. Evanston, Illinois: Row, Peterson & Co.

Platt, Rutherford. THIS GREEN WORLD. New York: Dodd, Mead & Co.

#### GRADE 6. UNIT III: PLANT LIFE.

##### TOPIC: BENEFICIAL BACTERIA, MOLDS, FUNGI. (October)

##### UNDERSTANDINGS.

1. Bacteria, molds, and fungi may be either harmful or beneficial. At this time we shall study the latter.

2. Bacteria are the smallest of known plants. They are so small that most persons have never seen them; but everyone is affected by them in some direct or indirect way.

3. Under a microscope bacteria are seen as tiny single-celled plants. On the basis of form they are usually divided into three types: round (coccus), rod-shaped (bacillus), and spiral (spirillum).

4. Bacteria are present almost everywhere: in the air, in fresh and salt water, in soil, in foods, and in decaying matter.

5. Most bacteria are unable to make their own food and so are dependent on other living or dead plants and animals.

6. Bacteria multiply simply but very rapidly and effectively. By dividing into two halves (fission) a single plant may, under favorable circumstances, increase to over a billion in ten hours.

7. Without bacteria that cause decay the world would soon be an impossible rubbish heap. In this way they return to the soil important elements needed for plant growth.

8. Bacteria improve soil fertility by forming lumps or nodules on legumes (pea family) such as clover, alfalfa, and soybeans. These nodules contain nitrogen in a form readily usable for successful growth of many of our crop plants.

9. Many bacteria are essential in industry. Some cause milk to sour so that we can make butter and cheese; others change cider to vinegar; still others cause the retting of flax in the making of linen.

10. Molds and other fungi (sing. fungus) are non-green (lack chlorophyll) plants that, like most bacteria, are dependent on other plants or animals for food.

11. The most important part of a fungus is the mycelium, an interwoven mass of thread-like tissue which corresponds to the entire root-stem-leaf system of an ordinary land plant.

12. The mycelium eventually gives rise to fruiting bodies of various forms on which are borne the spores.

13. The visible part of a mushroom is merely the fruiting body of the fungus.

14. It is true that many of our native mushrooms, including puffballs, are very palatable; but there is no way of separating the poisonous varieties from the edible or non-poisonous and only an expert can be sure.

15. Mushrooms are important allies in hastening the decay of dead plant material.

16. Molds, like mushrooms, are dependent plants that grow from a mycelium which in turn gives rise to spores. Likewise they are capable of helping or harming us.

17. Certain of the blue molds lend color and flavor to choice cheeses, such as Camembert and Roquefort.

18. A close relative of the common green bread mold is one from which the wonderful disease-destroying drug penicillin is obtained.

19. Yeasts are fungi well known for their help in causing our bread to "rise." They are plants made up of single cells.

20. Yeast plants grow by taking in sugar and giving off alcohol and carbon dioxide.

21. When bread is baked the carbon dioxide bubbles escape and the alcohol evaporates.

22. The fermentation of fruit juice is also the work of yeast plants. In this way valuable alcohols are obtained.

#### SUGGESTED APPROACHES.

Discuss the pasteurization and care given to the handling and preparation of our daily milk. Discuss what happens to apple cider when left standing for several days without refrigeration.

Place some of the "blue mold" cheeses, puffballs, or earth star on a table in the classroom. A green "fuzz" may have been observed on bread.

A disease may have been successfully combatted with penicillin.

#### ACTIVITIES.

1. Read the story of Leeuwenhoek (1632-1723), the Dutch inventor of the microscope, and how he first saw living objects invisible to the unaided eye. Through reading and discussion find out about beneficial bacteria.

2. Visit a local dairy or milk plant to witness the close attention paid to retarding the growth of bacteria.

3. Obtain jars of raw and pasteurized milk. Examine and compare the two jars at daily intervals, noting changes in appearance and smell.

4. Visit a sewage-disposal works where aeration and conditions are made favorable for the rapid growth of decay-producing bacteria.

5. Dig up a member of the pea family such as clover and carefully examine roots for

small nodules of nitrogen-fixing bacteria. When washed and dried these roots may be mounted on paper and labeled.

6. If an earth-star puffball is available note how this "nature's barometer" reacts to changing moisture and conditions.

7. Spore prints are quickly and easily made by taking the cap of an umbrella mushroom, laying it right side up on a piece of paper and covering it with a bowl or glass jar. After a few hours a beautiful spore pattern results. Because the spores are of different colors use both dark and light papers.

8. Look for "fairy ring" mushrooms in lawns and pastures. These were thought in ancient times to represent the paths traversed by dancing fairies. Learn the real reason for this formation.

9. Consult your doctor, school nurse, or druggist concerning diseases for which penicillin is prescribed.

10. With a microscope look at some mold for threads (mycelium), spore cases, and spores.

11. Expose pieces of bread (covered with a saucer) to different degrees of moisture, or to sunlight (uncovered) and determine the conditions most favorable to development of mold.

12. Observe how dough "rises" when bread is baked. (See unit in Grade 6, Chemistry of the Home.)

13. Obtain a jar of untreated fresh cider. Watch, taste, and smell at weekly intervals.

14. Visit a mushroom-growing plant or someone who raises mushrooms for home use.

#### BIBLIOGRAPHY.

Parker, Bertha M. — DEPENDENT PLANTS — Row, Peterson and Co.

Thomas, W. S. — FIELDBOOK OF COMMON MUSHROOMS — G. P. Putnam & Sons.

Cornell Rural School Leaflets — BACTERIA — Cornell University.

#### GRADE 6. UNIT III. PLANT LIFE.

##### TOPIC: LANDSCAPING OUR SCHOOL GROUNDS. (October and April)

##### UNDERSTANDINGS.

1. Careful planning of the school grounds should provide for adequate play areas, and make the grounds attractive for the community.

2. Usually a detailed plan of the grounds is made before the buildings are erected.

3. Drawing plans in advance provides a long range program, makes the work accurate, and avoids needless waste and expense.

4. The advice and help of authorities on landscaping is needed before undertaking development of school grounds.

5. Pupils and teachers and parents can co-operate in making the school grounds more useful and beautiful.

6. Trees on the school grounds furnish shade for hot days as well as beauty, and material for natural science studies.

7. Shrubs properly selected and placed help fit the buildings into the landscape, provide screening, help deaden sound, add beauty of form and color, furnish cover and food for animals and birds, make separate play areas for different age groups, furnish study material for art as well as natural sciences.

8. Flowering bulbs, perennial and annual flowers add color to the school grounds, bring enjoyment to pupils through planting and watching plants grow.

9. Development of beauty in school grounds encourages similar development of home grounds throughout the neighborhood.

10. Plants differ in their requirements as to soil, moisture, shade or sun, ability to withstand smoke and dust of city; and must therefore be selected for the school grounds with the conditions there prevailing in mind.

11. Some of the conditions in 10 may be modified by effort on the part of the children, teachers, and school custodian.

12. Conditions favorable to soil or wind erosion may be present, to be studied and corrected by planting of grass or other ground covers, shrubs, and trees.

13. The value of light and sunshine for life is emphasized through study of conditions favorable for growing plants.

#### SUGGESTED APPROACHES.

Can we improve our play space and make our grounds look better?

Are there sufficient trees and shrubs on the school grounds to attract birds, and to furnish shade? Are they well placed?

A visit is made to well designed neighboring school grounds, city park, or playground. Can we make our school grounds as useful and attractive?

Pictures or drawings of attractive school grounds are posted on bulletin board.

A rainstorm may develop gullies on the playground, raising the question of preventive plantings.

Cutting across grass plots may bring the suggestion of placing walks or drives where they are most needed.

#### ACTIVITIES. (October).

1. Through trips about the school grounds, observe and study the present school setting and development already made.

2. From the above, decide what are the needs: play areas, lawns, shrubs and trees, bird feeding stations and birdhouses, parking areas.

3. Select a part of the school grounds in which the class may work.

4. Consult School or City Park Departments regarding plans already made by landscape architect for development of grounds.

5. Decide whether plans made are suitable and useful. Get permission from school authorities to proceed with those available or to be drawn.

6. If not already provided, draw simple scale plans, with help from local landscape authority.

7. From the plans select one project for the class to carry out during the year.

8. Determine what steps may be taken in fall and winter in preparation for spring planting: viz., preparation of soil for planting grass, bulbs, or flowers; placing of bird feeding stations; watching for winter erosion development; places where walks are needed; soil study and testing; drainage and exposure problems should be watched for.

9. Study seed and nursery catalogs to select material for spring planting.

List plants, materials, tools needed, determine what are already available, and cost of additional material and equipment.

10. Study and test soil from various sections of the school grounds.

Study preparation of soil for planting of grass in the spring, in readiness for April project.



11. Collect and save leaves in compost pile; place others around shrubs already planted. Never burn them. Determine why they should be saved.

12. Stake out places for planting of shrubs, lawn, trees, or flowers.

13. Arrange with parents and teachers for help in the heavier planting. Perhaps the P.T.A. may supply funds for purchase of materials.

14. Work out plans for care of the school grounds including lawn cutting, proper pruning of shrubbery.

15. Study proper pruning of ornamental shrubs. Is the pruning of shrubs on school grounds being well done now? If not, make recommendations for desirable changes in procedure.

16. From the school grounds project proceed to study of what is being done to make the city or town more beautiful: better roads, street tree planting, playgrounds and parks, planting grounds about public buildings, city planning: zoning. Laws requiring keeping grounds clean, dumping rubbish. Regulations regarding removal of top soil. Are there trash collections? Regulations for burning of trash? Does the city collect and process leaves? Billboard regulation.

17. What is being done on state and national basis? Highway development, parks and recreation areas, town, state, and national forests, waterways, irrigation, control of stream pollution.

#### ACTIVITIES. (April).

From plans made the previous October, carry out some of the following:

Grade and plant lawn areas, using grass seed mixtures best adapted to the locations selected.

In readiness for Arbor Day, order one or more trees to plant in the sites selected last October.

Order shrubs needed; flower seed or bulbs needed.

Prepare to encourage increased bird population by planting about building foundations or borders of property shrubs containing fruit or seed attractive to birds as food.

About the edge of shrubbery plantings, plant bulbs or annual flowering plants selected to provide color through the summer and especially before school closes in June and after opening in September.

Through grading, and planting of ground cover, correct the gully erosion in the school grounds.

Put up birdhouses where possible to provide nesting sites for bluebird, tree swallow, house wren, chickadee, flicker, screech owl, or other local species that will use birdhouses.

Secure aid of local landscape man in demonstrating to class and school grounds superintendent (or whoever is responsible for care of grounds) proper methods of pruning and other care of shrubs, trees, and lawn.

Grow in schoolroom windows the flowering plants to be set out in June around edges of shrubbery.

#### BIBLIOGRAPHY.

Nursery and seed catalogs.

Latest circulars on IMPROVING THE SCHOOL GROUNDS, PLANTING HOME GROUNDS, GROWING PERENNIAL AND ANNUAL FLOWERS, MAKING A LAWN.

Material may be obtained from Extension Service, University of Massachusetts, Amherst, Mass.

United States Department of Agriculture, Division of Publications, Washington, D. C. Office of nearest County Agricultural Agent.

Massachusetts Horticultural Society, 300 Massachusetts Avenue, Boston.

Rural School Leaflets, Cornell University, Ithaca, New York.

Massachusetts Forest and Park Association, 3 Joy Street, Boston, will furnish a Circular on Trees for Massachusetts.

Massachusetts Audubon Society, 155 Newbury Street, Boston 16, will furnish Circulars: "Build Bird Populations with Food Plants."

"Help the Birds Find a Home." (Bird Houses).

## **GRADE 6. UNIT IV: INSECTS.**

### **TOPIC: LIFE OF THE BEE. (October and May)**

#### **UNDERSTANDINGS.**

1. Bees are insects and have six legs, three body parts, and other general characteristics of insects. Bees, ants, and wasps belong to the insect order Hymenoptera. Bees go through four stages in their life history—egg, larva, pupa, and adult.

2. There are many hundreds of different kinds of bees, but the honeybee is the only one which has been domesticated by man and it is the most interesting and important to us.

3. Bees are social insects. That is, they live in highly organized colonies or societies in which each bee performs a special function or task for the good of the colony as a whole.

4. Bee societies are like human societies because there is division of labor and the bees work together for the common good. However, the social behavior of the bees is inherited and instinctive. There is no intelligent learning and planning as there is in human society.

5. There is one queen bee in every bee colony. The queen is the most important member of the colony because only she can lay eggs which produce new members of the colony. Without a queen the hive would perish.

6. Most of the bees in a colony are worker bees. The average hive has 20,000 to 60,000 workers. The workers perform all the tasks of the hive except egg-laying. Worker bees are well adapted for their jobs.

7. There are usually several hundred drones in a colony. Drones are male bees whose only function is to mate with a new queen. Drones perform no useful tasks and are driven from the hive in the fall in order that the winter food supply may be conserved.

8. Bees are of great economic importance to man for several reasons: they assist in the pollination of fruit trees and other crops; they produce honey from the nectar of flowers; they produce beeswax which has many commercial uses. Many farmers, fruit growers, and others keep bees in managed hives and apiaries.

#### **SUGGESTED APPROACHES**

Hives are observed in a nearby orchard. Why does the orchard owner keep bees?

A beekeeper is invited to tell the class about his work or hobby.

Someone in the class tells of a visit to an apiary.

Honey and beeswax are displayed.

Some use of beeswax is brought to the attention of the class. What other uses has beeswax? How is it produced?

#### **ACTIVITIES.**

1. Set up an observation hive in the classroom. This is preferably done in the spring but may be done in the fall so that the bees may be observed throughout the winter and spring. Winter observation hives create an unnatural condition, because out-of-doors the bees are less active on account of limited food supply. Observation hives with glass sides and packaged bees may

be ordered from science supply houses or from bee concerns. Have someone with experience in handling bees help set up the hive. This person will demonstrate to the class equipment used in handling bees and explain something about the hive and the activities of the bees.

2. Record observations of bee activities in the observation hive and in the field during the fall, winter, and spring. Some things to look for:

Find the three different kinds of bees in the colony. The queen may be distinguished by her long, tapering body. The drones have large, stout bodies. The workers are the smallest and most numerous members of the hives. Make drawings showing the difference in appearance of queen, drones, and workers.

Observe the activities of the queen bee. See her laying eggs if possible. Notice how she is fed and cared for by the worker bees. Find out in books more about the interesting life of the queen, and about her important functions in the life of the colony.

Observe the activities of the worker bees and try to determine what tasks they are performing. It has been shown that there is a definite sequence of tasks which the bees carry out at different ages. The young bees do most of the work within the hive. The hive bees may be seen feeding and caring for the young and the queen, storing pollen and honey brought in by the field bees, cleaning and repairing the hive, covering cracks and foreign bodies with "bee glue" or propolis, ventilating and guarding the hive. When making wax the bees hang in clusters and exude scales of wax from the under side of the body. The older bees are field workers and may be observed bringing in loads of nectar, pollen, bee glue, and water.

Look for the four stages in the life history of the bee in the brood frames. Eggs will appear as comma-shaped white specks in the bottom of cells. After three days the egg hatches into a tiny white grub which grows until it almost completely occupies a cell. After eight or ten days the cell is capped over with a raised wax cap and the young bee goes into the pupa stage. Worker bees emerge from the pupa the 21st day. Watch the young bees eat their way out of their wax cells and take their places in the hive. Some of the eggs may develop into queens or drones. Queen cells are conspicuously large and thimble-shaped. Why do beekeepers destroy queen cells? How and why are new queens raised by the workers? Drone cells are larger than the worker cells but not as large as the queen cells.

Look for cells where pollen and honey are stored. Notice that food is stored in the outer cells of a frame while the center cells are reserved for brood. Pollen is made into bee bread which is used to feed the young bees. Honey cells are capped over with wax when enough water has evaporated to make it the proper consistency. The worker bees fan the honey stores with their wings to hasten evaporation of water from the nectar.

Observe the activities of the bees in winter. How is warmth maintained within the hive? If food supplies are low, the bees may have to be fed with sugar syrup during the winter.

In spring observe bees in the field. How do they gather pollen and nectar and how do their activities help pollinate blossoms?

3. If it is impossible to have an observation hive in the school room observe and study the activities of bees by visiting an observation hive in the neighborhood or museum.

4. Obtain one of the excellent movies on the life of the bee.

5. Have an empty bee hive and beekeeping equipment brought to class. If possible have a beekeeper demonstrate the equipment and tell the class about beekeeping and the activities of bees.

6. The class may be able to visit an apiary or members of the class may make such a visit and report to the rest on what they saw.

7. Collect books, articles, and pictures about bees and have pupils give oral reports or write themes on various phases of bee activities.

8. Study dead worker bees under a microscope or hand lens to observe adaptations for nectar and pollen gathering. Study the stinger and find out when and how it is used.

9. Find out more about the uses of honey and beeswax. Set up an exhibit showing the many uses of these bee products.
10. Write for Department of Agriculture and Extension Service bulletins on bees and bee-keeping.
11. Find out from a farmer or from the Extension Service what effect spraying with DDT and other insecticides has on bees. Why is it desirable to avoid killing bees when spraying for insect pests?
12. Find out something about the relatives of the honeybee: the bumble bees, mason bees, solitary bees, wasps, hornets, and ants. In the fall or winter collect as many of the nests of these bee relatives as possible and study them. Compare the social life of these insects with that of the honeybee.
13. Discuss the similarities and differences between insect societies and human societies.
14. Visit a greenhouse where bees are used for cross pollination of cucumbers.

#### BIBLIOGRAPHY.

- Curtis, G. D. *BEE'S WAYS*. New York; Houghton-Mifflin Co. 1948.
- Grout, Roy A. *THE HIVE AND THE HONEYBEE*. Hamilton, Ill.; Dedant and Sons. 1946.
- Kenley, Mrs. Julie. *CITIES OF WAX*. New York; D. Appleton-Century Co. 1935.
- Lance, Phillip C. *QUEENDOM OF THE HONEYBEE*. Harrisburg, Pa.; The Telegraph Press. 1938.
- Maeterlinck, Maurice. *THE LIFE OF THE BEE*. New York; Dodd, Mead and Co. 1940.
- Parker, Bertha. *INSECT SOCIETIES*. Row, Peterson Co. New York.
- Pellett, Frank Chapman. *THE ROMANCE OF THE HIVE*. New York; Abingdon Press. 1937.
- Phillips, Mrs. Mary. *HONEYBEES AND FAIRY DUST*. Philadelphia; Macrae-Smith Co. 1926.
- Stuart, . *CITY OF THE BEES*. New York; Whittlesey House. 1949.
- Teale, Edwin Way. *THE GOLDEN THRONG*. New York; Dodd, Mead Co. 1945.

#### GRADE 6. UNIT IV: INSECTS.

##### TOPIC: THE MOSQUITO. (April)

Mosquitoes are winged pests, more widely distributed than any other insect. They are not only a nuisance, causing discomfort, but some, notably the genus *Anopheles* in the north, are dangerous to health. These are the mosquitoes that carry the malarial germs.

##### TOPICS FOR STUDY.

1. The life cycle of the mosquito.
2. Chief body parts (and their functions) of larva, pupa, and adult. Difference in body characteristics of male and female.
3. Feeding habits of various mosquitoes.
4. Activities of male and female mosquito. How the mosquito "hums". How the mosquito draws blood.
5. Breeding spots. Breeding habits.

6. Number of eggs. Length of time from laying of eggs to maturity.
7. Common species of New England.
8. How to distinguish between the dangerous and comparatively harmless species.
9. The mosquito as a nuisance to man. Include the activities of the botfly. The mosquito as a danger to man.
10. Natural controls; e.g., fish, birds, insects. Control measures.
11. Stories of heroism in connection with the study of the mosquito.
12. How mosquitoes are used to combat certain diseases.

#### ACTIVITIES.

1. Raise mosquitoes from egg to adult, in an aquarium covered with mosquito netting.
2. Observe and keep dated record of the life cycle.
3. Watch activities of larva, pupa, and adult.
4. Study body parts of each phase, using lens. Make large drawings.
5. If possible, get a specimen of *Culex*, our comparatively harmless mosquito, and a specimen of *Anopheles*, the malarial germ carrier. Make drawings to show how to distinguish between the two.
6. Take a trip around the neighborhood to find mosquito breeding spots. Decide what should be done to eliminate them or at least reduce the danger of breeding. For example, clean up tin cans, which fill with water; cover rain barrels; drain or fill in where stagnant water collects; cover larger pools with kerosene oil or introduce animals which will eat the mosquito.
7. Collect information from books, magazines, and pictures.
8. Write illustrated booklets.
9. Make large posters to teach mosquito control.
10. Introduce a giant water bug into a jar full of wigglers. Watch what happens.
11. Draw small colorful or ink pictures, approximately 5" x 5", to use in a delineascope. Give illustrated talks on the mosquito, telling about its life history, distribution, dangers, and control.
12. Read about the work of scientists, who risked their lives in the study of the mosquito.
13. Learn how to protect oneself against the mosquito and how to treat mosquito bites.

#### BIBLIOGRAPHY.

- Comstock, Anna B. HANDBOOK OF NATURE STUDY. Ithaca, New York: Comstock Publishing Co.
- Fairchild, Graham. "Life Story of the Mosquito". National Geographic Magazine, February, 1944.
- Herrick, Glenn W. INSECTS INJURIOUS TO THE HOUSEHOLD AND ANNOYING TO MAN.

#### GRADE 6. UNIT IV: INSECTS.

##### TOPIC: CONTROL OF PESTS IN THE HOME. (June)

#### UNDERSTANDINGS.

1. Only a fraction of all insects are harmful to the interests of man.
2. Our war against these pests should not prejudice us against the vast majority of insects

which help us in the following ways: pollination of plants; aeration and enrichment of soil; disposal of organic matter; preying upon and acting as parasites upon harmful insects; providing materials of direct benefit to man, such as honey, ink, varnish, dyes, and silk.

3. Of those insects which carry disease and annoy man, the Diptera are the most important. These are insects which never have more than one pair of wings—flies, mosquitoes, and midges. True lice (Siphunculata) and the fleas (Suctoria) are wingless insects which come next to the Diptera in importance. The ticks, which are in the same phylum (Arthropoda) as the insects, but which belong to the class Arachnida (scorpions, mites, ticks, and spiders) are also important carriers of disease.

#### SUGGESTED APPROACHES.

- Bulletin board display of the common pests of the home, pictures, and actual specimens.
- Posted advertisements of insecticides.
- Exhibit of moth-eaten clothes or materials.

#### ACTIVITIES.

1. Field trips to areas infested with pests under consideration.
2. Reading of material cited under "references".
3. Preparation of "How to Fight" circulars and posters after a thorough study into the life history of each pest.
4. Tests and experiments on control of local pests (to be undertaken on school premises or at some spot where permission has been obtained.)

#### OUTLINE OF CONTENT.

##### **Flies.**

The house fly is the one most often found in man's dwellings. It never bites. It breeds in human and animal excrement, acquires germs and then crawls on human food. It spreads typhoid and intestinal diseases. It is accused of spreading infantile paralysis, tuberculosis, leprosy, and yaws.

Each female may lay 1,000 or more eggs, which hatch in a few hours with warmth. Larvae (maggots) mature in about a week; pupal stage lasts about four days. The best control is to prevent breeding by proper sanitary measures. With the decrease and better care of stables and cow barns, and with improved sewage disposal, the house fly is far less a menace than it used to be.

Fly paper is recommended over swatting. Swatting leaves disease laden fluids on walls and furniture.

##### **Fleas.**

Three kinds of fleas are a nuisance to human beings. They are the dog and cat fleas and the human flea. In the east, the dog and cat fleas are most common. The human flea, more common in the west, may also live on many different animals, dogs, cats, and, particularly, hogs.

The most serious disease carried by fleas, in conjunction with rats, is bubonic plague, although typhus is sometimes carried by fleas.

All fleas require blood in order to reproduce. All pass through four stages: egg, larva, pupa, and adult; the whole process usually takes about four weeks.

Derris or cube powder applied to the skin of cats and dogs will keep them free of fleas. It does not kill fleas immediately and must be repeated occasionally. The backs of hogs should be sprinkled with crankcase oil every two or three weeks. For cellars, out-houses, and places where it will not do damage, creosote oil applied as a spray is most effective. In living quarters, naphthalene flakes should be scattered in infested rooms, which should remain closed for forty-eight hours.

### **Bedbugs.**

The common bedbug is *Cimex lectularius*. It is world-wide in its distribution. It has never been proved that bedbugs serve as disease carriers in the United States.

The female lays ten to fifty eggs every few days. (Thus bedbugs of all ages are found.) Bedbugs mature in about two months.

During the day bedbugs hide in mattresses and in cracks and crevices. They travel from one house to another. Thoroughly spray crevices in beds and rooms with odorless kerosene. (Care must be taken to prevent fire.) Pyrethrum and rotenone may be added to the spray. Heating rooms to temperatures of 120 to 125 degrees is also effective. To make sure of complete extermination, call professional insect exterminators for a thorough fumigation.

### **Lice.**

True lice are wingless insects of the order Anoplura. Three kinds are particularly annoying to human beings: the Head Louse (*Pediculus humanus*), the Body Louse (*Pediculus corporis*, sometimes known as the cootie), and the Crab Louse (*Phthirus pubis*). Lice of the genus *Pediculus* transmit typhus fever from man to man. (Fleas transmit typhus from rodent to man.) Trench fever and epidemic relapsing fever are spread by lice.

Control of lice lies in personal cleanliness and fumigation. Head lice may be controlled by use of kerosene. Sterilization of bedding and clothing is by steam or slow ironing.

### **Silverfish.**

There are two common species of silverfish: common silverfish which has a uniform silvery color, and the fire brat which has dusky markings on its back. Silverfish thrive best in damp, warm basements. They feed on bookbindings, wallpaper, rayon fabrics, starched clothing, and are very fond of moist wheat flour.

Females lay from six to ten eggs. These hatch soon, but take about two years to reach maturity. Adults are very hardy and have stayed alive 319 days without food. Control may be effected by using poisoned baits. (See formula in U. S. Department of Agriculture Leaflet No. 149.)

### **House Ants.**

Killing the worker ants which invade homes does little good. It is necessary to kill the egg-laying queens in order to break up the colonies. Locate the colonies and pour one or two tablespoonfuls of carbon disulphide down the cracks or holes. A gas is formed on exposure to the air which kills the ants. (Great caution must be exercised as this gas is highly inflammable.) Ten-percent DDT powder applied to the ant hill is also very effective; and ordinary fly sprays will help somewhat. When the colony cannot be located poisoned baits are the next best control.

### **Clothes Moths.**

Destructive clothes moths are very small. The webbing clothes moth and the case-bearing clothes moth are the common pests. Only the larva is destructive, but most of the moth's life is spent in this stage. Adult moths live about two weeks. The female lays 100 to 300 eggs, in clothing, furniture, upholstery, and cracks.

Thorough control may be had through fumigation by a pest control agency. (Since poison gas is used, extreme precautions have to be taken.) Sprays, aerosol bombs, and mothproofing solutions help. Temperatures of 125 to 130 degrees will quickly kill all adult moths and larvae. Proper storage (paper bags, cedar chests, closets treated with naphthalene flakes) sunning and brushing, and good housekeeping combat moths.

### **Carpet Beetles.**

Four species of carpet beetles are commonly found in dwellings. They pass through egg, larva, pupa, and adult stages. The adults fly about readily and may fly between houses. Females

lay over a hundred eggs. Only the larvae cause damage. Larvae are difficult to control because they crawl into inaccessible places.

Many of the same protective measures used in controlling moths work with the carpet beetle. Use naphthalene flakes in storing clothing. Spray cracks with contact sprays such as oil-pyrethrum. Carpets should be vacuum-cleaned on both sides. They should not be tacked down and should not touch the wall. Good housekeeping helps prevent infestations of carpet beetles.

### **Cockroaches.**

Five species of cockroaches are found in American homes. They are nocturnal, and hide near the sink, behind radiators, etc. Roaches secrete an oily fluid with a nauseating odor. This ruins food as do the pellets of excrement.

Control is difficult. Even when a house has been cleared, it is often re-infested. It may help to watch possible sources of entry, such as food supplies, or laundry baskets. The best possible control is complete fumigation by a professional concern; but where re-infestation is likely the expense of fumigation is hardly warranted. Cracks should be filled with putty, plastic wood, or plaster of paris. Sodium fluoride powder may be spread in places frequented by roaches. (This is effective, but must be used carefully, because it is a poison dangerous to people.) Pyrethrum powder is safer, being harmless to man and his pets.

### **BIBLIOGRAPHY.**

Curran, C. H., and Lutz, Frank E. "Insects, Ticks, and Human Diseases." Guide Leaflet No. 113. The American Museum of Natural History.

U. S. Department of Agriculture Leaflets No. 144, "Cockroaches and Their Control"; No. 145, "Clothes Moths"; No. 146, "Bedbugs"; No. 147, "House Ants"; No. 149, "Silverfish"; No. 150, "Carpet Beetles"; No. 152, "How to Control Fleas"; No. 182, "Housefly Control".

## **GRADE 6. UNIT V: CHEMISTRY IN THE HOME.**

### **TOPIC: FOOD. (November)**

#### **OUTLINE OF CONTENT.**

##### **Classes of Food.**

1. Our bodies need food for growth to build body tissues; for heat; for energy; and for fighting disease.
2. There are six classes of food: carbohydrates, proteins, fats, vitamins, minerals, water.
3. Sugars and starches are carbohydrates. Carbohydrates furnish energy. The following foods contain carbohydrates: cane sugar, most fruits, potatoes, bread, syrups, milk.
4. Vitamins are necessary for the proper functioning of the body. Lack of vitamins causes certain diseases, such as rickets. One will obtain the proper vitamins if he eats a sufficient amount of vegetables (mostly leafy ones), milk, fruits (especially citrus fruits), butter, eggs, cereals, and meat (such as liver).
5. Certain minerals are needed by the body, and are obtained through foods, mainly milk, vegetables, and fruits.
6. Fats are necessary to furnish heat to the body. Examples of fats are butter, bacon, cream, nuts, olive oil, salad dressings, lard and lard substitutes.
7. Water is necessary for the proper functioning of the body.



8. Proteins are necessary to build body tissues. Foods containing proteins are milk, eggs, cheese, meat, and some cereals.
9. A well balanced meal contains all six of the above classes of foods.

### **Leavening Agents.**

1. The making of biscuit, cake, and bread is based on the use of leavening agents, which are those substances that cause dough to rise.
2. In the bread dough, sugar coming in contact with the yeast at the proper temperature gives off carbon dioxide gas. This gas in attempting to escape causes the dough to rise. When the dough has risen sufficiently it is placed in the oven. The heat kills the yeast, drives off the carbon dioxide, and bakes the dough to bread.
3. Other agents that liberate carbon dioxide may be used in biscuit and cake making; e.g., baking powder, and baking soda with sour milk.

### **Preserving Foods.**

1. If we don't take proper care of our foods they will spoil.
2. Spoilage is usually due to minute organisms (bacteria, protozoa, and parasites) which have entered the food.
3. Foods may be preserved in many ways.
  - a. Kept cold or frozen; e.g., milk, butter, meat, frozen fruits and vegetables.
  - b. Smoked; e.g., fish and meat.
  - c. Dried; e.g., dates, figs, prunes and apricots.
  - d. Sealed away from air in a sugar solution.
  - e. Stored in containers with salt or sugar, vinegar, spices, and other appropriate substances; e.g., salt and spiced meat, and pickled fruits and vegetables.
  - f. Sealed away from air; e.g., eggs in water glass.
  - g. Heated in order to kill all organisms and sealed away from air; e.g., canned fruits, vegetables, and meats.
  - h. Many times a combination of these methods is used in the preservation of foods.

### **Cooking Foods.**

1. Foods are cooked not only to make them more palatable but also to make them more digestible and free from harmful organisms.
2. Foods may be baked, boiled, steamed, broiled, or fried.
3. Care should be taken that foods are not either over or under cooked. Over cooking reduces the food value of certain foods, especially vegetables. Under cooking, especially of some meats, may be dangerous to health. The eggs of certain parasites, unless killed by sufficient heat, will hatch in the human body and cause weakness which may result in death.
4. The use of pressure cooking helps to preserve many of the food elements often destroyed by long cooking in an open dish.

### **Cleanliness in Handling Foods. Care of Food.**

1. Sensible habits of food preservation and handling are adequate to keep foods from spoiling. If a person becomes too germ conscious he is undergoing needless worry.
2. Hands should be washed before handling and eating food.
3. Utensils used in cooking and serving food must be scalded frequently.
4. Everything coming in contact with food should be kept spotlessly clean.

## SUGGESTED APPROACHES.

Question arises in cooking class, "What makes bread rise?" or "Why is soda added when sour milk is used?"

The question "Why?" is raised when told we should not use tap water in the aquarium.

Discussion of a "balanced meal" is introduced in a health lesson.

How and why of preserving foods becomes a topic of interest because of home canning activities.

## ACTIVITIES.

1. Study about the classes of food and what each does for the body in books, pamphlets, and advertising materials.

2. Test different common foods for the presence of carbohydrates, proteins, and fats. To show there is water in our foods, take one-half pound of spinach and spread it out to dry. Weigh after it is dry.

3. Collect and organize an exhibit of the six classes of food, using pictures, as well as the real article.

4. Find out the results of deficiencies in the different diet needs.

5. If conditions are right carry on experiments with white rats

6. Plan, prepare, and serve a "balanced meal".

7. Prepare large illustrated charts showing several each of good morning, noon, and evening meals. Indicate on each chart what of the classes of food each item contains with the approximate quantity. Find the cost of each meal.

8. Prepare charts telling how much of each class of food a growing child should have with illustrations to show the best sources of each.

9. Prepare posters which will emphasize the need of drinking water, or any other health angle of diet. Include the need of cleanliness in the handling of foods.

10. Leaven dough, using a variety of leavening agents. Find out what is common to all

11. Preserve foods in as many different ways as circumstances make it practical. Some of the ways which probably could be tried in the classroom are: drying apples, preserving vegetables and fruits using heat, pickling, salt, or sugar.

12. Look at an egg shell from an egg which has been preserved in water glass through a microscope and compare with one which has not.

13. Set up experiments, which will show rate of spoilage.

a. Place samples of different foods, side by side, one preserved by some method, the other not. Keep records of results.

b. Keep a little milk where it is warm and another sample where it is cold. Note results.

c. Keep one bit of food exposed, another in a clean dish covered. Note results.

14. Visit refrigeration plant. Learn in what temperatures the different foods are kept.

15. Visit a market. List all the many ways there are of preserving and safe-guarding our food supply.

16. Find out if there are any laws regulating the public handling of foods and utensils touching foods, such as in food factories, food shops and restaurants. From findings discuss what this should tell us about home handling of foods.

17. Using charts made under 7, discuss how each food was prepared. Look up correct cooking time of the different meats and vegetables. Prepare a "time table" to post at home.

18. Find out the facts about pressure cooking. Study such a cooker, and how its works. Observe one being used.
19. Prepare pamphlets on foods, their care and preparation.

#### BIBLIOGRAPHY.

Government Bulletins and County Agent circulars on purefood laws and food, care of food, preparation of food and the preserving of foods.

Brem, Peter. SCIENCE EXPERIMENTS FOR CHILDREN. Wauwatosa, Wisconsin: The Kenyon Press Publishing Co.

### GRADE 6. UNIT V: CHEMISTRY IN THE HOME.

#### TOPIC: CLEANING AGENTS. (January)

##### OUTLINE OF CONTENT.

1. The secret in stain removal is finding the proper solvent, which will dissolve the spot without injuring the material.
2. A solvent is a substance that dissolves another substance; e.g., water dissolves sugar.

##### Stain Removal.

1. Syrup and coffee stains are removed by hot water.
2. Blood stains can be removed by cold water followed by hydrogen peroxide.
3. Fats are removed by carbon tetrachloride. Note: Carbon tetrachloride is non-inflammable. All cleaning fluids that are inflammable must so state. Some fat stains may be removed by placing brown paper or blotting paper over them and rubbing them with a hot iron.
4. Grass stains can be removed by alcohol.
5. Most ink stains can be removed by sour milk or a dilute solution of oxalic acid.
6. Many stains may be bleached by sulphur dioxide; hydrogen peroxide; bleaching powders and liquids, which contain chlorine.
7. Paint may be removed by turpentine.
8. Resin stain may be removed by alcohol.
9. Iron rust may be removed by lemon juice.

##### Soap and Soap Making.

1. Fat plus lye forms a soapy solution.
2. The addition of salt to this soap solution causes soap to form in layers at the bottom of the container. The soap may then be poured into molds of the desired shape and allowed to harden.
3. After the reaction is completed, no fat or lye is left. Entirely new substances are formed, one of which is soap.
4. Extreme precaution is necessary in handling fat and lye.
5. Lye coming in contact with the skin burns.
6. Fat is highly inflammable. A fire extinguisher should be handy.
7. Soap breaks up films of dirt and grease on the skin and clothing which then can be washed away.
8. Some soaps float because of the small bubbles of air blown into them while they are still soft.

9. The different odors of the various soaps are due to the cold creams and perfumes which have been added in their manufacture.

#### **Water.**

1. Hard water contains chemicals which prevent soap from giving a good lather.
2. The chemicals found in temporary hard water can be removed by boiling.
3. The chemicals in permanent hard water cannot be removed by boiling.
4. Various chemicals used to soften hard water are washing soda, borax, household ammonia, caustic soda.

#### **Purification of water.**

1. Contaminated water gives us various diseases. Even clean, sparkling clear water must be examined to see if it contains disease-producing micro-organisms.
2. There are various ways of purifying water.
  - a. Boiling kills micro-organisms.
  - b. Distillation removes solids and most liquids, and probably kills micro-organisms.
  - c. The addition of chlorine kills micro-organisms.
  - d. Filtration removes micro-organisms, when water is passed through a filter bed, constructed of a layer of stones covered by a layer of pebbles, covered by a layer of gravel, which in turn is covered by a layer of sand.
  - e. Water is purified when passed through a layer of carbon particles.
  - f. Aeration purifies water. When water is sprayed up into the air, oxygen helps to kill micro-organisms. Note: See "Living Out-of-Doors", a unit in Grade 6 for methods of purifying drinking water at a camp site.
3. Badly contaminated water must be treated with chlorine before any other process is used.
4. If there is any suspicion that the water at home or on a camping ground is contaminated, it should be boiled.

#### **SUGGESTED APPROACHES.**

Child spills ink or a bottle of milk on his clothes.  
There is discussion concerning the purity of town water.

#### **ACTIVITIES.**

1. Test methods of stain removal from different materials. Display pieces of cloth with different stains and beside them pieces from which spots have been removed. Below each sample tell the kind of material, the kind of stain, what solvent was used, how it was used, and the time it took. The cloth with the spot removed tells the result.

2. Collect advertisements, labels, empty cans, and bottles of different commercial cleaning fluids. Study each carefully, noting of what each is composed. Underline all inflammable ingredients in red. Note whether sufficient directions are given as to their use and warning as to dangers. Set up an exhibit with a poster warning against the use of inflammable cleaning fluids in the home. Include, perhaps on the opposite side of the table or chart, cleaning fluids and materials which are reasonably safe. Place colorful signs above such as: "UNSAFE";

"SAFE".

3. Prepare a circular on stain removal to be distributed.
4. Make soap or demonstrate soap-making if it seems unwise for children to handle the dangerous materials.

5. Set up a soap display of different soaps and soap wrappers.
6. Experiment with the cleaning properties of soap—hands, cloth, dishes.
7. Carry on research into the history of soap, followed by committee reports.
8. Write a booklet on soap; what it is; how it is made.
9. Take a trip to a water purification plant.
10. Study the city water supply and laws pertaining to the purification of water.
11. Prepare a booklet on "Pure Drinking Water".
12. Experiment with water to show:
  - a. That water contains dissolved mineral matter.
  - b. That water may be purified by sand.
  - c. How water may be purified by distillation
13. Prepare posters showing "Safe Water".

## **GRADE 6. UNIT VI. JUNIOR FOREST RANGERS**

### **TOPIC: WOODLOTS AND FORESTS. HOW TO HELP THE FORESTER. (November & May)**

#### **UNDERSTANDINGS.**

1. The term "conservation", whether applied to forestry or other natural resource, means "wise use".
2. The term "restoration" in the case of natural resources means bringing back a natural replaceable resource to a condition of former abundance.
3. The direct and indirect products of the forest are used by all of us in our every day life.
4. When European colonists first settled the Atlantic seaboard they found primeval forest and depended on much of its content for survival — food, houses, fuels and dyes.
5. In the past 300 years the American people have wasted forest products through greed and carelessness.
6. Only within the past 30 years has the need for proper forest management become apparent.
7. Conservation and restoration education, starting in the elementary grades and extending into adulthood, is needed if we are to continue our use of needed products at reasonable cost, and enjoy the recreational values of our forest lands.
8. As the need for forest conservation and restoration is understood, similar attitudes toward other natural resources logically follow.
9. Reforestation is carried on by public and private agencies.
10. National, State, and Town Forests are sample areas of forest conservation.
11. Forests have varied composition depending on climate, altitude, and stage of growth.
12. Each tree goes through three stages: youth, maturity, old age.
13. At maturity, or when reaching certain sizes for specific purposes, trees should be harvested.
14. The forest contributes lumber and other products; provides a home for wildlife; affects climate, stream flow, and water table; conserves soil and water; furnishes employment for two million men annually; provides healthful recreation areas; and provides income, thus helping to maintain a high standard of living.
15. An important interrelationship, sometimes known as the balance of nature, exists between forest and soil, water, animal and plant life.

16. It is everyone's responsibility to aid the forester in conservation and restoration of our forest lands.

#### SUGGESTED APPROACHES.

The cartoon film "Once Upon a Time" by "Ding" Darling may be shown to the class. This emphasizes in part the effects of unwise forest cutting.

"A Heritage We Guard", conservation film from the Division of Forests and Parks, State Department of Conservation, may be shown to the class.

A near-by forest fire calls attention to need for effective forest patrol.

A visit is made to local forest fire tower, or to National, State, or Town Forest.

Local forest warden visits class to tell of his experiences in forest patrol.

Arbor Day celebration brings up question of "Why Plant Trees?"

A pupil asks "What are forest products?" leading to a discussion of forest products.

A picnic in town or state forest brings up question of their management and use.

#### ACTIVITIES.

1. Organize a group to present a play relating to forest fire prevention.
2. In the dangerously dry season make posters for bulletin board or local store windows emphasizing the dangers from forest fires.
3. Gather pictures, newspaper clippings, and stories for bulletin board or a forestry scrap book.
4. As a class write for circulars and posters to the following:  
 Forest and Park Association, 3 Joy Street, Boston.  
 Forestry Division, State Department of Conservation, Ashburton Place, Boston.  
 American Forest Products Industries, 1319-18th Street, N.W., Washington, D. C.  
 Extension Forester, University of Massachusetts, Amherst, Massachusetts.
5. Have a contest in class to name as many uses for wood as possible.
6. Write an essay on uses for forest lands.
7. Give a talk before the class on losses from forest fires.
8. Construct a soil erosion exhibit as described in Audubon Teacher's Guide, p. 12.
9. Take a planned trip to near-by Town, State, or National Forest.
10. Arrange with the State Forest Service to present a program in class of some phase of forest management; viz., forest planting, fire detection, fire prevention, how to start a school or town forest.
11. Call on the forest warden at the nearest fire tower. Ask him to explain his duties.
12. Organize a Junior Forest Ranger group and offer services to your forest warden in planting and patrol.
13. Read poems like "Trees" by Joyce Kilmer, "When Chapman Walked the Wilderness," by Douglass.
14. Borrow from Radio Station WBZ the transcription record of "Fighting a Forest Fire" presented on the "Let's Go Exploring" program in August, 1947, and play it in class.
15. Demonstrate proper way to build and to put out a campfire.
16. Learn how to determine the age of a tree from the cross-section of its trunk.
17. Tap sugar maple tree to gather the sap and look up method of making maple sugar.
18. Visit a sugar camp when the syrup is being made.
19. Keep a record of observations of a favorite tree during the spring, including time of flowering, when the leaves appear, when it fruits.

20. Make a list of twelve of the best shrubs and trees of your section producing food for birds and list the most important birds using these fruits.
21. Provide a display of the common deciduous trees of your neighborhood showing leaves and twigs, or prints of them (blue, spatter, crayon, or ink prints).
22. Show methods of tree seed dispersal through collection of seeds or prints of same, properly labeled.
23. Collect and label for the class museum samples of wood from different species of trees.
24. Arrange with authorities of the town forest to have the class lay out a nature trail. If no town forest is available arrange with a wood lot owner near the school, to use his land for such a purpose.
25. Survey and map the woodlands of the town.

#### BIBLIOGRAPHY.

Glover, Katherine. OUR AMERICAN FOREST. New York: Row, Peterson Company, 1941.

#### Bulletins and Leaflets.

American Forest Association. FOREST ACTIVITIES FOR EVERYONE; MEMORIAL FORESTS. Washington, D. C., 919 17th St. N.W.

American Forest Products Industries, Inc. AMERICA'S FORESTS; TREES FOR TOMORROW. Washington, D. C. 1319 Eighteenth St., N.W.

Boy Scouts of America. CONSERVATION. Merit Badge Series. New York: 2 Park Avenue.

Cornell Rural School Bulletins. #722, May, 1948, TREES AND PRODUCTS OF FARM WOODLANDS. J. A. Cope; WILDFIRE. Vol. 41, number 2, Fall, 1947, WOOD. Vol. 42, no. 3, 1949. E. Lawrence Palmer.

Massachusetts Forest and Park Association. TREES OF MASSACHUSETTS. Boston: 3 Joy Street.

National Audubon Society. AUDUBON TEACHER'S GUIDE. New York: 1000 Fifth Avenue, 1946.

National Recreation Association. ADVENTURING IN NATURE. Betty Price. New York: 315 4th Avenue.

U. S. Department of Agriculture. PREVENTING DESTRUCTIVE FIRES. Farmers' Bulletin No. 1926; ARBOR DAY, ITS PURPOSE AND OBSERVANCE. Farmer's Bulletin No. 1492; SOME PLAIN FACTS ABOUT THE FORESTS. Miscellaneous Publication #543; WATER AND OUR FORESTS. Miscellaneous Publication #600.

See also Basic Units on Conservation in Social Studies.

#### **GRADE 6. UNIT VII: FIRE, FRIEND AND FOE. (December)**

##### UNDERSTANDINGS.

1. Oxidation is the union of oxygen with some other substances. This process is accompanied by the liberation of heat.
2. There are two types of oxidation, slow and rapid.
3. Slow oxidation is decay if the substance is organic, or rust if the substance is inorganic

4. Rapid oxidation is that process that we know as burning.
5. In order to produce burning the temperature of a substance must be raised to that point at which oxygen from the air will begin to unite with it. This point is known as the kindling temperature, and varies with different substances. For example, it is higher for coal than for wood.
6. A flame is a burning gas. Examples: A candle does not burn; the vapor liberated by the heated wax burns. The burning of wood starts when gases are liberated by heat.
7. Fire must have material known as a fuel, oxygen, and a certain temperature. The removal of any one of these extinguishes the fire.
8. Water usually lowers the kindling temperature, thus extinguishing the fire.
9. One of the latest methods of fire fighting is the use of a fog. Fog surrounds the fuel with a blanket of minute water particles, thus preventing the oxygen from continuing to unite with the fuel; and the fire goes out.
10. There are two common types of fire extinguishers, the acid soda type and the carbon tetrachloride type.
11. The principle of both fire extinguishers is to produce a gas, which will form a blanket around the fuel and thus shut off the supply of oxygen.
12. Carelessness with bonfires or campfires, cigarettes, and cooking procedures can produce fires. Another type of carelessness is the furnishing of proper conditions for spontaneous combustion.
13. Slow oxidation of various substances, such as oily rags and papers, wet hay, grain, wet sawdust, soft coal, and moist flour liberates heat. When this heat cannot escape it heats the substance above its kindling temperature. It thus bursts into flame spontaneously.
14. A high concentration of dust in a small space having its temperature raised above the kindling temperature will explode. Places containing coal dust, saw dust, flour, or dust of any combustible material must be protected against lighted cigarettes or flames of any type.
15. Various gases, such as illuminating gas, or vapors from certain liquids such as gasoline, are highly explosive. Therefore flames must be kept at a considerable distance from such gases and vapors. Certain liquids, such as gasoline, must be handled as if they were gases.
16. Cleanliness and proper storage of the above substances can prevent spontaneous combustion; for example, oily rags should always be kept in a can.
17. The speed of combustion is determined by the amount of oxygen coming in contact with the fuel, the temperature, and the concentration of fuel.

### **Forest Fires.**

1. Causes: A few forest fires are caused by lightning, but most by man's carelessness, especially with smoking and outdoor fires.
2. There are three types of forest fires.
  - The duff fire is the burning, below the surface of the ground, of tree roots, decaying leaves, or any other inflammable material.
  - The surface fire is the burning of brush, seedlings, trunks of larger trees, and other material, on the surface of the ground.
  - The crown fire is the burning of the leaves and twigs at the tops of the trees. Crown fires because of the speed of their movements and their inaccessibility, are the most dangerous and difficult to fight.
3. Fighting forest fires.
  - The best way to fight fires is to prevent them.



If inflammable material is removed from the path of a fire the fire will stop; but if the gap is not wide enough the fire will jump the gap.

Back firing. This method burns out a strip so that when the fire reaches this point nothing is left to burn. It should be used only by able and experienced fire fighters.

Water, wet sand, or any wet material in the path of a fire will form a path of material that will not burn.

If brooms, green boughs, or other implements are used to put out fires, beat away from inflammable material and toward the fire.

Never get in front of a fire. Fighting is usually done at the flanks of a large fire

Keep cool. Form a plan and follow it.

#### 4. Consequences of fire.

Many lives and much very valuable property are destroyed by forest fires every year. This loss amounts to a staggering total. A recent example of the destructiveness of forest fires is the virtual leveling of the town of Bar Harbor, Maine, and six adjacent villages.

Valuable animal life is destroyed each year.

Forest fires cause the soil to become unfruitful.

Forest products, such as timber, wood alcohol, turpentine, maple sugar, and many others are destroyed.

Trees not destroyed become easy prey to wind storms and fungus infections.

The beauty of that locality is lost for many years.

#### 5. Prevention of forest fires.

Observe all rules for the proper handling of inflammable materials; e.g., outdoor fires, and cigarettes.

Build a stone fire-place for outdoor fires, where the fire will be built on stone and will be enclosed by stone. Remove all inflammable material from near-by area.

If this is impossible, choose an open spot, remove all inflammable material for a considerable distance, and dig a shallow hole.

The fire should be small. Never leave it unattended.

When breaking camp put out the fire by the liberal use of water and spread the coals.

### SUGGESTED APPROACHES.

Forest or brush fires are burning in the vicinity, or large fires are reported over the radio.

Woods are closed by drought.

Large fire caused by spontaneous combustion or an explosion starts questions.

Firemen inspect building.

### ACTIVITIES.

#### 1. Study in all available sources:

a. What fire is. What makes fire burn.

b. In what ways rusting and fire are the same. How different.

c. Fire as a friend. Fire as a foe. Causes of fires.

d. Types of forest fires, how to fight them, consequences of bad fires, and prevention of forest fires.

e. Meaning of kindling temperature, fuel, spontaneous combustion.

f. Correct ways of building a fire.

2. Have a fireman visit the school and explain the construction and use of fire extinguishers.

#### 3. Visit fire station to confer with firemen concerning

a. Common causes of hostile fires, and how to prevent them.

- b. What to do in case of fire in the home.
  - c. How to handle fires in the open.
  - d. The meaning of the "Fire Triangle".
4. Prepare a series of illustrated leaflets to be distributed in the school or to be placed in the School Science Room.  
Possible Topics: Correct Building and Care of Outdoor Fires.  
What Should I Do If My House Were on Fire?  
Protect Your Home From Fire.  
Is a Forest or Brush Fire Any of My Business?
  5. Make large posters depicting prevention or results of fires.
  6. Demonstrate correct and incorrect ways of building and caring for camp fires. Set up an exhibit so others can see.
  7. Collect data, clippings, and pictures of recent bad fires for a bulletin board. Show what might have been done to prevent the waste.
  8. Find out the regulations concerning the use of town and state forests and parks for recreation purposes.
  9. Make a map of forest areas of New England and especially of those near-by. Show roads, lakes, rivers, towns, and fire observation towers and wardens' stations.
  10. Find out how a coal stove, furnace, and fire-place work. Show by a diagram what makes a fire burn slowly or fast.
  11. Study fighting of forest fires. Ask an expert to talk to the children. Show by diagram patterns of typical fires: burning on the level, with or without wind; along a ridge; at the foot of a slope. Show effect of wet strip, sand barriers, back firing, etc. See Cornell Rural School Leaflet: WILDFIRE, Vol. 41, No. 2, 1947.
  12. Show and discuss good motion pictures on fire prevention.
  13. Draw or collect pictures showing the destructiveness of forest fires. Display these on a "reel", and lecture on the subject of preventing forest fires.
  14. Prepare a "Comic" book, a frieze, charts, posters, or diorama boxes showing "Do This", "Don't Do That"; suggestions follow. "This" shows cigarette being extinguished and put in a container in the car; "Not That" shows the cigarette being flipped from a car window. "This" shows orderly exodus from a building; "Not That" shows crowds rushing for the exit.
  15. Prepare lists of combustible material in the home; of incombustible materials; of possible fire danger spots in the home. Each child should study his own home.  
Discuss.  
Should these combustible materials be in the home?  
How should they be handled?  
Can all sources of fire be eliminated?  
What must be done to reduce fire hazards?

#### BIBLIOGRAPHY.

- Parker, Bertha M. FIRE, FRIEND AND FOE. New York: Row, Peterson and Co.  
Cornell Rural School Leaflet. WILDFIRE. Vol. 41, No. 2, 1947.
- Local fire station may have circulars.
- Material from the nearest fire insurance company office.
- Pamphlets from the State Forest and Park Department.

**GRADE 6. UNIT VIII: BIRDS.****TOPIC: SOCIETIES FOR THE SCIENTIFIC STUDY AND CONSERVATION OF BIRDS.****(September).****UNDERSTANDINGS.**

1. Birds have been a subject of great interest and study from ancient times. They reach higher in children's interest than any other phase of natural history
2. In older days, birds were watched as indices, true or otherwise, of weather, crop success or failure. In modern times they have been studied to determine their niche in the world.
3. Knowledge of bird structure and function has contributed to success in aeroplane design.
4. The diet of birds has been the subject of much study because of their influence on insect life, rodents, and weed seed.
5. The formation of societies for study, protection, and restoration of birds has resulted in saving perhaps one hundred species from extinction during the twentieth century in North America.
6. There are many types of groups interested in bird study.

**International or Hemispheric.**

International Society for Bird Protection; International Union for Protection of Nature; Pan American Union, Conservation Division.

**National.**

Private: American Ornithologists' Union; National Audubon Society; National Wildlife Federation; American Wildlife Institute.

Public: Fish and Wildlife Service; Soil Conservation Service; Department of Agriculture.

**Sectional or Local.**

Wilson Ornithological Club (largely mid-west but national in scope); Cooper Ornithological Club (West Coast); State or City Audubon Societies. Massachusetts.

Private: Massachusetts Audubon Society; Massachusetts Conservation Council.

State: Departments of Conservation and Agriculture.

Local: Nuttall Ornithological Club, Cambridge; South Shore Bird Club; Allen Bird Club, Springfield; Forbush Bird Club, Worcester; Hoffman Bird Club, Pittsfield, and other clubs; Natural History Museums; Audubon Junior Clubs in Schools and Museums.

**SUGGESTED APPROACHES.**

An invitation is received by the class or a member of the class to join a local bird club or the Massachusetts Audubon Society.

A near-by wildlife sanctuary operated by state or local bird society is visited to observe activities there.

The southward migration of grackles or geese may excite interest in bird study and lead to gathering of circular material published by Audubon Society or museum.

Observations at school or home bird feeding stations or bird bath bring up question — What groups are responsible for bird protection and what sort of food, feeders, and bird baths do they recommend?

A suggestion is made by teacher or pupil that an Audubon Junior Club be formed.

A sheet of wildlife poster stamps issued annually by the National Wildlife Federation is displayed.

#### ACTIVITIES.

1. Request an invitation from local bird club or Massachusetts Audubon Society for class to join such organization.
2. Organize an Audubon Junior Club to follow a program of Bird and Conservation Study in home and at school.
3. Look into the place of Audubon Junior Club in State Audubon Society; in national and international picture.
4. Contact the nearest local or state Audubon Society and find out about their program.
5. Find out whether any Federal or State Bird Sanctuaries are in your part of Massachusetts. How is bird life encouraged and protected there?
6. Visit a nearby wildlife sanctuary to observe methods of management.
7. Learn the duties of your local game and fish wardens. Study the state and federal game laws.
8. Write a theme on what a sixth grade student can do to help conserve and restore bird life.
9. Report to the class on 3, 4, 5, 6, or 7.
10. List the bird societies organized in your town. Are there any other local organizations interested?
11. What is the co-operative work relating to migratory birds carried on by Canada, the United States, and Mexico?
12. Draw a map showing the winter and summer homes of bobolink and golden plover. What do these maps indicate as to necessity of co-operation between countries for bird protection?

#### BIBLIOGRAPHY.

- Pearson, Gilbert T. ADVENTURES IN BIRD PROTECTION. New York: D. Appleton Century Co., 1937.
- Peterson, Roger T. HOW TO KNOW THE BIRDS. Boston: Houghton Mifflin Co., 1949.
- Wetmore, Alexander. MIGRATION OF BIRDS. Harvard University Press, 1926.
- Enrollment forms and pamphlets for Audubon Junior Clubs.
- Sample publications of —  
 Massachusetts Audubon Society; National Audubon Society; Fish and Wildlife Service; The Protection of Migratory Birds (Convention agreement between Canada, Mexico, and the United States); National Wildlife Federation; Soil Conservation Service, and others listed under Understandings.
- Sanctuary circulars of Massachusetts Audubon Society.
- Federal and State Regulations relating to birds.

#### VISUAL AIDS.

Consult local conservation organizations as Massachusetts Audubon Society, colleges, universities, museums, and sanctuaries, and your State Department of Education, to determine what films, slides, and other illustrative materials are available.

**GRADE 6. UNIT VIII. BIRDS.****TOPIC: ATTRACTING WINTER BIRDS. (January).**

## UNDERSTANDINGS.

1. Many birds spend the winter in northern climates while others migrate to southern states or beyond, to the West Indies, Central and South America.
2. Birds that are here during the summer may move southward in the fall while others of the same species from farther north replace them for the winter months.
3. Birds may be attracted about the house and garden in winter.
4. Birds bring color and activity into winter landscapes.
5. Birds even of tropical species can endure cold if they have enough to eat to keep up their high body heat.
6. Birds that are here in winter eat a variety of foods.
7. Cover of certain types is of special value to winter birds.
8. Attracting birds to a feeding station provides opportunity to identify different species easily, to study their habits, and to photograph them.
9. The feeding of winter birds gives the child a feeling of responsibility for animals, and an opportunity to share in conservation of wildlife as a part of our valuable natural resources.
10. The birds will well repay the food bill by taking injurious insects and their eggs from trees and shrubbery.

## SUGGESTED APPROACHES.

Birds may appear about the school buildings searching for food.

Interesting experiences with bird feeding stations at home or in neighborhood may be told by a pupil. Perhaps the teacher may have similar experiences.

A visit may be made to the feeding station of a neighbor, a nearby bird sanctuary, or another class that is feeding birds.

Attending a bird talk illustrated with slides or motion pictures may arouse interest in attracting birds to a feeder in order to photograph them. Similar results may come from a display of good bird photographs on the bulletin board.

Newspaper or magazine articles may recount the necessity and desirability of feeding winter birds.

Electric nature games, as well as the Audubon Bird Charts, may be of interest for identifying winter birds.

## ACTIVITIES.

1. Make winter feeding stations, with shelves, covered feeders, hanging logs, and crocheted suet bags. Set up feeding stations by schoolroom windows, and at home.

2. Study the factors that affect the birds about feeding stations. Natural foods available; weed seeds; insects and insect eggs; seeds and berries of trees and shrubs; grit.

Cover or natural protection from cold and from predatory birds or mammals: dense thickets; briars (as blackberry and rose); coniferous trees (as pine and hemlock); broad leaved evergreens (as laurel and rhododendron); brush piles.

Water: birds like to drink and bathe in winter; water needed especially in dry, snowless period.

Food provided at bird restaurants: seeds of various kinds; fruit, peanut butter, suet; crumbs of bread and cake and doughnuts; grit.

3. By dividing foods on bird restaurants and watching birds eat, determine the preferences of different species for certain foods.
4. Study the birds about feeding stations to learn the following: use of beak and feet in securing and using food; of feet and tail in perching and climbing; power of flight and adaptability of wing shape for maneuvering; frequency of eating for rapid metabolism and keeping warm.
5. Where facilities permit, study rudimentary structure of bird to know of adaptability for flight (hollow bones and wing structure), fluffed feathers for resistance to cold, types of bills and feet adapted for special uses, and digestive system.
6. For coastal areas or where there is open water, observe the ducks that winter in the area.
7. Keep daily or weekly records of birds observed during the winter.
8. Find out from local authorities which birds listed are regular winter residents, which unusual visitors.
9. Study the cost of feeding winter birds. Keep a record of the amount of food used and number of birds feeding there. What scraps of food from the table may be used at no cost? Get co-operation of family on this.
10. Make a list of other visitors at the bird feeding station: gray or red squirrel, flying squirrel, whitefooted mouse, Norway rat, neighbor's cat or dog.
11. Correlate with art work. Draw some bird at feeding station. Design an Easter card, using bird in the design. Design place cards for birthday party.
12. Make a study of bird song. (This might come in spring.) Note similarity of songs of certain birds such as robin, oriole, and rose-breasted grosbeak. Use Cornell bird-song records.
13. Write a theme for English class telling of experiences in feeding winter birds. Write an article for the local newspaper telling how the class fed the birds.
14. Visit an Audubon Sanctuary or the home sanctuary of some Audubon member to see the devices used to attract winter birds.
15. Photograph through the window pane birds at the feeding station

#### BIBLIOGRAPHY.

##### **Books.**

- Baker, John H., ed., AUDUBON GUIDE TO ATTRACTING BIRDS. New York: Doubleday, Doran & Company, 1941. pp. 38-91.
- COMPTON'S PICTURED ENCYCLOPEDIA AND FACT-INDEX. Chicago: F. E. Compton & Company, 1940. v. B, pp. 141-146, Murphy, Robert C., "How to attract and study birds".
- Comstock, Anna H., HANDBOOK OF NATURE-STUDY. Ithaca, N. Y.; Comstock Publishing Company, 1939. pp. 1-144.
- Forbush, Edward H., NATURAL HISTORY OF THE BIRDS OF EASTERN AND CENTRAL NORTH AMERICA. Boston: Houghton Mifflin Company, 1939.
- McKenny, Margaret, BIRDS IN THE GARDEN, AND HOW TO ATTRACT THEM. New York: Reynal & Hitchcock, 1939.
- Peterson, Rogert T., A FIELD GUIDE TO THE BIRDS. Boston: Houghton Mifflin Company, 1947.
- Pough, Richard H., AUDUBON BIRD GUIDE. New York: Doubleday and Company, 1946.
- Saunders, Aretas A., GUIDE TO BIRD SONGS. New York: D. Appleton-Century Company, Inc., 1935.

Treag, Dorothy, ed., AUDUBON TEACHERS GUIDE. Chapter 7, pp. 46-49—"Get Acquainted with birds by feeding them."

Vinal, William G., NATURE RECREATION. New York: McGraw Hill Book Company, 1940.

### Magazine Articles and Pamphlets.

ARNOLDIA, v. 5, no. 2-3, April 1945. pp. 5-20, Mason C. Russell, "Build Bird Population with Food Plants." (Reprinted)

Massachusetts Audubon Society, BULLETIN, v. 27, no. 3, April 1943. pp. 70-73, Mason, C. Russell, "Do you know your birds?" (Reprinted)

Massachusetts Audubon Society. Bulletin, v. 28, no. 8, December 1943. p. 232, Purdon, Josephine, "Whitefoot Mouse".

Massachusetts Audubon Society. Check Lists.

Massachusetts State Board of Agriculture, 1908. Forbush, E. H., "Useful Birds and Their Protection".

National Audubon Society, New York. BIRD STUDY FOR SCHOOLS.

Pt. III — Peterson, Roger T., Winter Feeding.

Pt. VII — Peterson, Roger T., Electric Nature Games.

U. S. Department of Agriculture, FARMERS' BULLETIN, No. 1644. McAttee, W. L., "Local bird refuges" Washington, D. C.: Superintendent of Documents.

U. S. Department of Agriculture, FARMERS' BULLETIN, No. 1783. Grange, W. B. "Feeding wild life in winter" Washington, D. C.: Superintendent of Documents.

U. S. Soil Conservation Service. Leaflets.

### OTHER SOURCES.

Audio-Visual Aids may be secured from many sources which will be listed under general references for the Course of Study in Science.

Reference literature is obtainable from many sources in the state such as:

Massachusetts Audubon Society

Massachusetts State Department of Conservation

Local Museums and Libraries.

## GRADE 6. UNIT VIII: BIRDS.

### TOPIC: MYSTERIES OF BIRD MIGRATION. (April).

#### UNDERSTANDINGS.

1. Migration is the movement of individuals or groups from one area to another. It is characteristic not only of certain North American birds but also of bats and butterflies and other animals.

2. Many more migrating species are found in the northern than in the southern hemisphere. Some species are non-migratory.

3. Birds that are with us the year round, such as chickadees, may not be the same individuals winter and summer. The summer population may migrate southward while a new population moves in from the north to spend the winter with us.

4. The reasons for migration have never been satisfactorily explained for all birds.

For some species the reason may be food, for others the influence of climatic changes, the pressure of over-population, or other factors.

5. We do not know just how birds find their way back to their nesting site each season, after perhaps thousands of miles of travel. They may succeed through instinct, through learning about landmarks since they have such keen vision, or through the guidance of air currents or some magnetic force.

6. Migration of birds has attracted attention of peoples since ancient time; it is recorded, for instance, in various passages in the Old Testament.

7. Many activities of people, including the movement of Nomads, have been predicated upon weather conditions as foretold by bird flights.

8. Bird banding, tried out many years ago but developed systematically in comparatively recent years, has furnished definite information on direction and distance of bird migration and age of birds.

### SUGGESTED APPROACHES.

The return of robin, bluebird, and redwing in the spring attracts attention on the way between school and home. Where have they been this winter?

On the bulletin board, charts may show the extensive travels of a bird like bobolink or golden plover to South America or the robin to Georgia or Florida.

The class visits an Audubon Sanctuary or a local banding station to see bird banding operations.

### ACTIVITIES.

1. Examine in some book or pamphlet migration maps for birds.

2. On a map of the western hemisphere insert the route of travel both north and south for such birds as bobolink and golden plover, showing also nesting range and winter range. The pupil may select a bird whose migration route he would like to work out from records and books.

3. Keep a record of arrival of spring birds, indicating in what sort of habitat they were seen and over what period they stayed.

4. Study in Duck Bulletins or other sources what is meant by waterfowl flyways. Give a talk to the class. Note: Because birds migrate to raise young and perpetuate the species, spring migration shooting has been outlawed in this country.

5. Visit a local bird-banding station.

6. Write on some important facts about birds' life histories as determined from bird-banding records; e.g., age, distance from summer nesting area to wintering place. How has bird migration affected international co-operation in conserving natural resources of the Americas?

7. Of the birds observed at feeding stations the past winter, list permanent residents and winter visitors. Where do our winter birds spend the summer?

8. List the various reasons given for bird migration, as gleaned from leaflets and books in the school library.

9. What quotations can you find in the Bible showing interest of ancient peoples in bird migration?

10. Look up some of the length of life (longevity) records as given in recent issues of Bird Banding in the Audubon House library or your own public or school library.



## BIBLIOGRAPHY.

Griscom, Ludlow, MODERN BIRD STUDY. Cambridge, Mass.: Harvard University Press, 1945. pp. 9-111.

Lincoln, Frederick C., MIGRATION OF AMERICAN BIRDS. New York: Doubleday Doran and Company, 1939.

Parker, Bertha M. and Park, Thomas, ANIMAL TRAVELS. (Basic science education series — intermediate). Evanston, Ill.: Row, Peterson and Company, 1941.

Treag, Dorothy, ed., AUDUBON TEACHERS GUIDE. New York: National Audubon Society, 1944. Chapter 9, pp. 53-60, Peterson, Rogert T., "Bird Migration".

Wetmore, Alexander, MIGRATIONS OF BIRDS. Cambridge, Mass.: Harvard University Press, 1926.

BIRD BANDING. Northeastern Bird Banding Association, Charles B. Floyd, Secretary, 310 South Street, Boston. (Bound copies may be found in many scientific libraries.)

Many bird books will contain a chapter or so on Bird Migration and may be used with satisfaction.

**GRADE 6. UNIT IX: ELECTRICITY. (January.)**

## UNDERSTANDINGS.

1. Chemical action can produce electricity. Electricity can be generated by suspending a copper rod and a zinc rod for two-thirds of their length in a solution of sulphuric acid. When the tops of these rods are connected with a wire, electricity will flow through the wire from the copper to the zinc. This is called a simple Voltaic cell.

2. A storage battery produces a chemical reaction that forms electricity. After the reaction has gone through to completion, these original substances have disappeared and can no longer perform the reaction that generates electricity. To "charge" the battery, electricity is allowed to flow through the battery, which causes the original substances to re-form

3. A dry cell is a modification of a Voltaic cell. In place of the copper rod, it has a carbon post. In place of the zinc rod, it has a container made of zinc. In place of sulphuric acid is a paste of manganese dioxide and ammonium chloride.

4. The only safe source of electricity for experimenting in school is the dry cell.

5. Generators (dynamos) are large power-driven machines, which produce great quantities of electricity and send it long distances. This is the electricity we use in our homes.

6. The movement of a wire through a magnetic field produces an electric current in the wire.

7. The same effect can be produced by holding the wire still and moving the magnet.

8. The magnetic field is that area of influence surrounding a magnet. A little piece of iron placed two feet from a weak magnet will be undisturbed. Brought one foot nearer, it will probably be undisturbed. Brought within six inches, it will probably be drawn to the magnet. That point at which the magnet obtains such a grip on it is the edge of the magnetic field. (See Primary Curriculum Guide — PLAYING WITH MAGNETS.)

9. A circuit is the path along which electrical current moves.

10. If there is a continuous metallic path from the dry cell, or other source of power, through a light, or bell, or toaster, or other device, and back to the source of power, we have what is known as a closed circuit.

11. Electrical devices will work only while the circuit is closed.

12. As much electricity must return to the power house as leaves it. It is like a group of trucks carrying food to the city. As many trucks return to the farm as left it, but minus the food. Likewise as much electricity returns, minus its energy.

13. If we break the flow of electricity, the device stops working. Switches, buttons, and chains are devices which will break a circuit.

14. The two ways of wiring are known as series and parallel. If there is but one path for the current, this is a "series" circuit. If there are two or more paths for the current, this is a "parallel" circuit.

15. Electricity in motion is referred to as an electric current.

16. Electricity standing still is called static electricity.

17. Electricity normally does not flow nor form a current on an insulator or an insulated conductor, but tends to spread out uniformly over the entire object. Under such circumstances it is known as static electricity. Such electricity is produced on objects by friction. If you rub your feet on the carpet under certain conditions, your body becomes charged with static electricity. This can be proved by touching a metal object. A spark is produced, which gives the person a shock.

18. There are various units of measurement used in electricity:

a. AMPERES measure the rate of flow of the electricity.

b. VOLTS measure the electrical force pushing the electricity through the circuit.

c. OHMS measure the amount of resistance being offered to the passage of the electrical current.

d. WATTS measure the power of electrical current.

19. The longer the wires and the smaller the diameter, the greater the resistance offered to the passage of an electrical current. When resistance is great enough, heat is generated by the electricity forcing itself through the wire, as seen in an electric toaster and heater.

20. Wires of such a small diameter that the heat generated by the passage of electricity would cause them to burn when placed in an oxygen-free medium of an electric light bulb, will throw off light.

21. Amateurs should never attempt to repair or explore radio or television receiving sets.

22. Wires which are connected to a source of high voltage are very dangerous.

23. It is very dangerous to touch electric fixtures when the hand or body is wet.

24. Insulation on electric cords used in the home should be frequently inspected.

25. NEVER take a chance with electricity. If there is any question, call an expert.

#### SUGGESTED APPROACHES.

A table with all kinds of electrical appliances or parts of electrical equipment on it; e.g., insulated wire, bell, light socket, push button.

Pictures of different ways of lighting houses; the history of electric lights, etc.

Electrical problems arising from some activity. For example: lighting the Christmas tree; the first grade doll house; the stage for a puppet show; peep boxes; miniature air field; show cases.

Questions: Why did all our lights go out when only one bulb was gone? What makes our toaster red hot? From where does our electricity come? (Any question raised by the children at any time, whether about to begin the unit or not.)

Watching a storage battery being charged.

Visiting Electric Light Company, and seeing how many electric appliances there are.

## ACTIVITIES.

1. Recall learnings in connection with magnetism. See Primary Curriculum Guide, Grade 2: PLAYING WITH MAGNETS. Take any of the activities suggested there, or others (see bibliography), in order to make clear the mean of "magnetic field".

2. Experiment with static electricity. (If taken in the winter months.)

a. Rub your feet on a carpet and touch a metal object or another person.

b. Rub paper on the desk.

c. Rub a balloon with wool or fur and you can make it stay anywhere you wish.

Rub a piece of paper on the blackboard and leave it.

d. Comb your hair vigorously.

e. Rub a comb or a hard rubber fountain pen with woolen cloth and pick up paper.

f. Suspend a pith ball (balsa wood or puffed wheat) one-fourth inch in diameter by silk thread, eight inches long. Rub sealing wax with flannel, or a hard rubber rod with fur. Place the rod near the ball. Note what happens. Do the same, using a glass rod and rubbing this with silk. (Note: If the question "why" arises, explain very simply about the theory of protons and electrons and what happens when you have an excess of either one.)

g. Put two thin books a few inches apart. Place between these scraps of paper or bits of hair. Put glass over this. Rub the glass with silk. Note what happens.

h. Hold a rod of sealing wax or hard rubber which has been rubbed with wool or fur near a fine stream of water. Note what happens.

i. Discuss dangers of home dry cleaning. (See Units "Chemistry in the Home", and "Fire".)

j. Bring a hard rubber or sealing wax rod, which has been rubbed with flannel or fur, near two pith balls fastened to silk threads about six to eight inches long, suspended from a wooden support. Note what happens. Bring a glass rod, which has been rubbed with silk, near the balls. What happens? Suspend a rubber or sealing wax rod as the balls were suspended, and bring near it first the hard rubber which has been rubbed as above, and then the glass rod. What happens?

k. Discuss with the children whether what they have been playing with is of any practical use.

3. Study of and experiments with current electricity. Note: Use dry cells ONLY, while experimenting with current electricity.

a. Discuss with the children what must be done to make electricity of practical use. (They should understand that we must make it go where we want it to go. Some substances will let electricity flow quite freely. These are called conductors. Others will hold it relatively static. These are called non-conductors.)

b. Connect one dry cell to a small light or bell. Cut one of the wires, thus breaking the circuit. Test materials to see if they are good or poor conductors: wood, paper, water, salt and water, acid and water, iron, silver, copper, "tin", rubber, chalk, stone. Do this by putting both ends of the cut wire against the material or in the solution being tested and noting if the bell rings or the light lights.

c. Show how to connect two wires by scraping off the insulation, connecting the wires, and then winding the base wire with insulation tape.

d. Learn how to connect two dry cells together, and these to a light or bell.

e. Discuss dangers of current electricity. Make safety posters showing the "Do's" and "Don'ts" in handling electricity.

f. Discuss and demonstrate a closed circuit. Install a bell in the room or in a doll house.

g. Draw a diagram showing a closed circuit. Have the children trace all circuits to make sure that each is complete and correctly set up. Tell how all electricians do this most carefully. This must become a habit. Do no wiring without it.

h. Put a switch between the bell or light and the dry cell. Note how it works. Take a push button apart and see how it opens and closes the circuit.

i. Make a switch with screws, a board, and a small piece of metal (a piece of a "tin" can works well), bent so it can be pushed down at will to close the circuit.

j. Through setting up dry cells and lights in series and parallel wiring, decide which would be the better for the doll house, "Stop - Go" sign for the safety unit, our miniature airport, or identification board. Draw diagrams of the circuits before a decision is made.

k. Wire a doll house, a puppet stage, a shadow picture frame, a "Stop - Go" sign, a small city, a miniature airport, an identification board. Use whichever method of wiring you decided was best.

l. If the question arises as to the meaning of volts, ohms, amperes or watts, terms seen on lights and electric appliances, explain what each means and where the name came from.

m. Demonstrate: if resistance to the electric current is great, heat and light are produced. Study an electric light bulb. Compare the wires used in an electric light, a toaster, and a cord.

n. Study fuses, taking one apart. What is the purpose of a fuse? What is meant by a "blown out" fuse? What should be done if a fuse blows out in your home? Why should all wires and electrical appliances be carefully checked by an electrician before replacing a fuse?

o. Take a dry cell apart and see what is inside.

## **GRADE 6. UNIT X: AIR PRESSURE AND DEVICES DEPENDENT ON AIR PRESSURE (February).**

### UNDERSTANDINGS.

1. Air has pressure of 14.7 lbs. per square inch. Normally pressure of air on an object pushing inward is the same as the pressure of air inside the object pushing outward.

2. Air pressure is capable of holding up heavy materials such as mercury in a tube.

3. There must be air pressure in order for various devices to work, such as air pump, vacuum pump, siphon.

4. Water at sea level cannot be raised more than approximately 33 ft. by a lift pump, because the air pressure is not strong enough to lift a longer and thus heavier column of water.

### SUGGESTED APPROACHES.

During the study of weather the question of how the mercury barometer works is discussed.

A farmer is having to carry water because his well is low and consequently his pump will not work, although there is water in the well.

The suggestion is made that we empty the aquarium, using a siphon.

### ACTIVITIES.

1. With the aid of a vacuum pump remove the air from the inside of a tin gallon can. Notice how the sides collapse toward the center, because the pressure of the air from within has been removed, and the air on the outside has nothing restraining it from pushing in the sides of the can.

2. Remove some of the air from the inside of a milk bottle by burning a small piece of paper in the bottle. Before it is entirely consumed put a thin sheet of rubber over the top. Note what happens.

3. Obtain a glass tube approximately 32" long and closed at one end. Fill it with mercury. Hold the thumb over the open end and turn upside down. Stand this inverted tube in a dish of mercury, removing the thumb only after the mouth of the tube is below the surface of the mercury in the dish. Watch what happens when the thumb is removed and measure the column of mercury. Note: the mercury is held up in the tube by the pressure of the air on the mercury in the dish.

4. Fill a glass with water. Cover the top with a flat piece of cardboard. Invert the glass, being careful not to disturb the cardboard. The pressure of the air on the cardboard is greater than the water in the glass so the water remains in the glass.

5. Obtain a bicycle pump and use it to fill a tire with air. Find, study, and draw diagram to show how air pump works.

6. Experiment with a siphon. Empty an aquarium and try to figure out how the water can flow up and over the top of the container before it empties into the pail. Show diagrammatically how it works. Find out where siphons are used.

7. Study the way a water pump works. If a demonstration glass pump is available, the process can be watched. Find, study, and draw diagrams to show how water pump works.

8. To raise water to a greater height than approximately 33 ft. a force pump is necessary. Show this diagrammatically also.

9. Discuss with a farmer what happens when his well gets low. See Unit VI. Grade 5.

SOIL AND EROSION PROBLEMS. Grade 4. WEATHER.

#### BIBLIOGRAPHY.

Hessler, John C. JUNIOR SCIENCE. Benjamin Sanborn Pub. Co.

Hunter and Whitman. DOORWAYS TO SCIENCE. New York: American Book Co.

Millikan and Gale. HIGH SCHOOL PHYSICS.

#### **GRADE 6. UNIT XI: AIRPLANES. (February.)**

The present day significance of transportation by air is an important study. The social understandings are nearer the growth level of sixth grade children than are the principles underlying flying. The science understandings are very difficult unless so simplified that there is danger of misconception.

There are, however, certain science understandings which should be taken as the social studies aspects are being studied. These can be shown through demonstration, observation, diagrams, experiments, and visitations to air fields and weather stations.

#### UNDERSTANDINGS.

1. Air resists moving bodies.
2. Air exerts a buoyant force upon objects in it.
3. Man uses the force of the air to help him.

#### STUDY TOPICS.

1. Properties of air and how it acts under varying conditions.
2. The four forces with which all flying objects must deal — weight, lift, thrust, drag.

3. Airfoils. Controls. Meaning of instrument flying.
4. How landings and take offs are controlled.
5. Weather and weather forecasting as it affects the aviator.
6. Color used in aviation.
7. Different types of planes and purposes for which each is used. Speed of different planes.

See units on air travel in Social Studies and in Reading.

## **GRADE 6. UNIT XII: GREAT SCIENTISTS.**

### **TOPIC: BIOGRAPHICAL STUDIES. (March)**

This unit is planned to present a comprehensive summary of the discoveries of some of the outstanding scientists and interesting facts about their lives.

Incidents in the physical as well as the biological field may be selected by committee groups and dramatically presented to the entire class.

#### **SUGGESTED LIST FOR STUDENT REFERENCE:**

- Bolton. FAMOUS MEN OF SCIENCE.
- Caldwell. SCIENCE FOR TODAY.
- Coffman. CHILD'S STORY OF SCIENCE.
- Cotter, J., and Jaffe, H. HEROES OF CIVILIZATION.
- Lansing. GREAT MOMENTS IN SCIENCE.
- Nida. EARLY MEN OF SCIENCE.
- Patch and Howe. WORK OF SCIENTISTS.
- Williams and Ellis. MEN WHO FOUND OUT.

## **GRADE 6. UNIT XIII: FRESH WATER FISH AND FISHING.**

### **TOPIC: THE ART OF FISHING. (March)**

#### **UNDERSTANDINGS AND CONTENT.**

1. Through the study of the fresh water fish of our immediate environment we learn (1) the rudiments of fish identification, (2) the relationship of fish to other water life and the necessity for balance, (3) the necessary balance between water life and the life of surrounding land areas, (4) the importance of fish to man, and (5) man's duty to his fish crop.

2. The total fish population on this planet is greater than the total population of all other vertebrates put together.

3. Fish are cold-blooded aquatic animals with backbones. Some are carnivorous, some are herbivorous.

4. The typical fish has specialized equipment for life in water: spindle-shaped body, scaly skin, fins, gills, air-bladder. So many fish are not typical that only a special scientist, called an Ichthyologist, can positively identify some kinds. Fish are of many sizes (from the Phillipine Goby, one-half inch in length, to the Whale Shark, more than fifty feet long), many shapes, and much difference in equipment—all to suit conditions.

5. We study fish because they are an important source of food not only for people but

for many animals and birds. They are valuable, therefore, in the balance of nature, and should be conserved.

6. In Massachusetts, all fresh water fish are edible, though not all are equally palatable. The state makes and enforces laws for the protection of the popular fish. Our protected fish, broadly classified, belong to six families and fifteen species.

7. In many cases, our fresh waters are seriously polluted by waste disposal and soil erosion. Conservation education is needed.

8. Of all our natural sports, fishing has the greatest number of active participants. In this state, fresh water fishing is largely recreational, but so many fish are taken that conservation methods must be used. Since natural reproduction must go on, fishing is outlawed during the breeding and spawning season. State fish hatcheries raise and release fish, thus stocking streams and ponds.

9. A farm fish pond, well managed, can be made to produce fish regularly.

10. Every fisherman should be a good sportsman, and should know and practice all rules laid down by man and nature for the good of all. He selects his equipment carefully, and plays square. Boys and girls, too young to be licensed, should co-operate fully with the conservation program, and should learn how to be really good fishermen. Licenses control fishing activities, and give financial support to the entire state program.

11. Sportsmen sometimes destroy animals that prey upon fish, justifying their action by saying that they are protecting the fish for the use of man. This practice is wrong, because they are often mistaken. Trained conservationists should decide when such destruction is necessary.

#### SUGGESTED APPROACHES.

Provide each child with a copy of the State Sportsman's Guide.

Place in the classroom a tank filled with nothing but water. The curiosity of the children will promote questions.

Wildlife Restoration Week is celebrated annually during the week of March 21st. This is an opportune time for the lesson introduction.

Fish is served in school cafeteria, leading to a discussion of source and kinds of food fish.

#### ACTIVITIES.

1. Visit a pond or lake where sunfish may be observed during their spawning season. From the edge of the water it is usually possible to see the sunfish on guard in the clean-swept circular spawning beds.

2. Visit a museum for special discussion.

3. Study the Sportsman's Guide to learn fishing regulations.

4. In co-operation with a local fish and game club, plan a class fishing trip.

5. Write compositions on any subject pertaining to fish.

6. Have a contest for the telling of true fishing stories.

7. Have class bring fishing equipment to school for display. Give adequate warning concerning the handling of barbed fish hooks.

8. Set aside an area in the school yard or gymnasium for the playing of SKISH. This game teaches bait casting with rod and reel and hookless plug. Ordinarily it is played on water but it can easily be adapted to land. See bibliography.

9. During fishing season have class fishermen deep freeze samples from their catch and bring them to class for observation.

10. After first getting permission from proper conservation authorities to do so, stock classroom tank with native protected fish. The tank should be properly prepared with due consideration for balance between fish, oxygen, and food supply.
11. Visit farm fish pond and discuss problems of raising fish with owner.
12. Visit fish hatchery and observe methods used in raising fish for re-stocking Massachusetts streams and ponds.

#### BIBLIOGRAPHY.

- Bergman. WITH FLY, PLUG, AND BAIT. New York: William Morrow and Co., 1947. Color plates of flies, text drawings, data on how to fish.
- Hawes. FISH AND GAME NOW OR NEVER. New York: D. Appleton-Century Co., 1935. Source for conservation material.
- Jordan and Everman. AMERICAN FOOD AND GAME FISHES. New York: Doubleday Doran and Co., Inc. Excellent for identification; non-technical.
- La Gorce, ed. THE BOOK OF FISHES. National Geographic Society.
- LaMonte. NORTH AMERICAN GAME FISHES. New York: Doubleday, Doran and Co., Inc., 1945. A field guide to fresh and salt water fish; non-technical.
- Morgan. FIELD BOOK OF PONDS AND STREAMS. New York: G. P. Putnam's Sons, 1930. Vertebrates and invertebrates of fresh water; reference for natural fish food
- Morton. BOYS' GUIDE TO FISHING. Greenberg Publishers, 1947.
- Rodman, Oliver. THE BOY'S COMPLETE BOOK OF FRESH WATER AND SALT WATER FISHING. Boston: Little, Brown Co., 1949.
- Westerman and Hazzard. FOR BETTER FISHING. Education Division Department, Conservation, Lansing 13, Michigan, 1947. Source for conservation material.
- Wulff. LET'S GO FISHING. Philadelphia: J. B. Lippincott Co., 1939. A boy's introduction to the sport of fishing.

Pamphlets, Magazines, Visual Aids available through the following services:

- DEPARTMENT OF CONSERVATION, 15 Ashburton Place, Boston 9.  
 Division of Law Enforcement—Sportsmen's Guide giving game regulations; free.  
 Division of Fisheries and Game—permission to keep alive protected fish for educational purposes; to secure competent conservation officers for speakers before children; free.  
 Division of Forestry—Film catalog; free.
- THE ENTERPRISE MANUFACTURING CO., AKRON, OHIO.  
 Catalog of fishing tackle and tips to the fishermen; free.  
 Make inquiries concerning game of SKISH. Game may not be included in latest catalog.
- MASSACHUSETTS FISH AND GAME ASSOCIATION, INC. 20 Spruce Street, Boston 8.  
 Catalog of state speakers on conservation and wildlife; free.  
 Catalog of available films on conservation and wildlife; free.  
 Junior conservation bulletins Nos. 3 and 5; 1 copy free. \$3.00 per 100.
- NATIONAL WILDLIFE FEDERATION, 20 Spruce Street, Boston 8.  
 "Marine Fish; Fresh Water Fish," a Conservation Leaflet issued by the Service Division; one free copy.  
 Packet containing mounted pictures of salt and fresh water fish; free.



STATE EXTENSION SERVICE. University of Massachusetts, Amherst.  
Catalog of films, free.

SUPERINTENDENT OF DOCUMENTS, U. S. Government Printing Office, Washington,  
D. C. "Fish Stocking", Bulletin 35; \$.10.

U. S. FISH AND WILDLIFE SERVICE, 59 Temple Place, Boston 11. Film catalog, free.

## **GRADE 6. UNIT XIV: LIVING OUT-OF-DOORS. ENJOY, NOT DESTROY.**

### **TOPIC: GOING CAMPING OR PICNICKING. (June)**

#### UNDERSTANDINGS.

1. Living out of doors as much as possible has many advantages. It is a healthy life, develops self-reliance, provides opportunity for outdoor adventuring, develops increased powers of observation, and offers possibilities for the actual practice of conservation.

2. Good manners are as necessary and desirable outdoors as inside. We need more training in outdoor good manners. Too many people leave a trail of discarded food, papers, boxes, tin cans and broken glass.

3. Hacking or cutting down trees or shrubs, and the uprooting and picking of flowers which need protection are other examples of bad outdoor manners.

4. Birds and other animals have their place in the balance of nature, and the wise camper and hiker will protect rather than harm them. Learning how these animals live will provide far more interest and pleasure than killing them.

5. One match, cigarette, or live coal may burn thousands of acres of valuable woodland. The careless camper or hiker is responsible for many such fires.

6. Simple precautions and skills make life in the outdoors safe and pleasant.

#### SUGGESTED APPROACHES.

Pupils tell of their own experiences in living outdoors or relate stories appropriate to the subject. The teacher may add her own experiences.

Pupils tell about damage caused by fires set by careless campers. Some pupils have had actual experience with such fires.

The teacher or a committee of pupils place on the bulletin board picture material illustrating "Outdoor Living". Fire prevention posters, those showing animals needing protection, and pictures of camping grounds with evidence of both good and bad manners might be included.

#### ACTIVITIES.

1. In preparing for hike or picnic, the class formulates its own "Code of Outdoor Good Manners."

2. Pupils look at their own school yard for evidences of good and bad outdoor manners.

3. In visiting nearby park and camping grounds, note in what condition they have been left, and repair damage as far as possible.

4. During short hikes in the vicinity of school, stress observation, the use of the five senses in exploring, and keeping the code of outdoor good manners.

5. Lists are made of the trees and flowers, birds, and other animals which were observed on hikes, with comments on their identification, use, and place in nature.

6. Plans for half-day and all-day hikes which may include cooking, are made by the class. (Details are suggested under overnight hikes.)

7. Pupils bring in pieces of camping equipment and set up an exhibit in the school-room. First Aid Kits should be included, as they are standard equipment on all hikes.

8. Equipment which can be made at home or in school for little or no expense is shown. This might include Tin Can Cook Kits, Flour Sack Knapsacks, and other easily made objects.

9. A discussion of proper clothing. Clothes which withstand hard usage and permit free movement, together with flat-heeled oxfords or other shoes which lace, should be worn for outdoor living.

10. Pupils bring in pieces of different woods and discuss the kinds needed for quick, short fire, or slow, long-lasting coals. For kindling, the following are suggested: birch bark (from dead trees only), dead pine needles, dry leaves, old mice and bird nests, dry grass. Bark and branches from dead timber, or dead lower branches of trees burn well. For quick, short fires use dead hemlock, spruce, balsam, pine, cedar, tamarack, or dry poplar. For long-lasting coals use hickory, oak, maple, birch, beech, and white ash. Woods which burn well green as well as dry, though not as well in the spring, are yellow birch, white ash, beech, and hickory. Split wood burns better than round branches.

11. Pupils practice building fires on the school grounds. This will include Proper preparation of the ground. Clear space of all dead leaves and material which might burn, or build on bare rock; **never** under or near trees or on pine needles.

Types of fires. Teepee, Log Cabin, Seminole, Star Fire, Green Log Fire. (See Scout Handbooks and other references.)

Size of fires. Keep cooking fires small. Several small fires are preferable to one large one which has the disadvantage of taking time to burn down to coals, and of being more difficult to put out.

Lighting fires. Face the wind, cup hands, and point head of match toward the wind; light fire on windward side.

Cooking should be done over beds of hot coals, not over flames.

Methods of putting out fires.

12. An overnight camping trip is planned by the class, with attention to the following details.

Adequate knapsacks or other devices for carrying supplies comfortably.

Proper folding of blankets for outdoor bed rolls is demonstrated by experienced campers. Method of setting up tents is shown.

Compass and its use. On light cloudy or sunny days the "watch compass" may be used. Point the hour hand of watch directly toward the sun; halfway between it and twelve is due south.

Cooking equipment necessary. Tin Can Cook Kits or Scout Kits; pot holders or heavy gloves for handling hot pans.

Tools necessary or useful. Jack-knife, hunting knife, axe, only for those trained in their safe use. Matches in water-proof container. Soap for outsides of pans, to be rubbed on dry so that soot from fire comes off easily when pan is washed.

Food. Class or committee plans menu and figures quantities and costs. Simple foods which are typical of the outdoors, instead of the usual hot dogs and cokes, should be included. These may be such as the following.

Pioneer Drumsticks: hamburg, salt, finely cut onion if desired, cracker crumbs, egg (one for four persons is sufficient to hold mixture together). Mix and pat thinly on end of peeled green branch about one inch in diameter. Turn slowly over hot coals to cook. Cooking sticks are made preferably from sweet green woods such as maple, birch, poplar or sassafras, but care must be used in cutting so that trees are not damaged.

Bread Twists: Mix in birch bark bowl or tin cup or large leaf: 1 handful of flour; 2 fingers

pinch of salt (the amount two fingers can hold with the thumb placed over them) ; 3 fingers pinch of baking powder; 1 finger pinch of butter or lard; water or milk to make a stiff dough. Use sparingly. Handle dough lightly, and after flouring hands, make into long roll as thick as thumb. Wind this around smooth peeled branch as in recipe above, pressing ends down tightly and leaving space between twists for better browning. Turn continuously over hot coals until twist loosens on stick and is well browned.

On overnight hikes collect and cut breakfast wood at night and put under cover.

Safe drinking water. Unless water has been tested, use either Halazone tablets which can be purchased at drug store, or add 4 drops of Iodine or 10 drops of Zonite to a gallon of water, as measured by leader. In each case the water must stand one half hour before use.

Camp site. Begin to look for it early in the afternoon, not when nearly dark. Necessities: good supply of wood and water; open level spot, high enough to be well drained; some sun and breeze to drive insects away; permission for use from owner.

Overnight needs. Blanket roll or sleeping bag; poncho or oilcloth or other water repellent material for protection against damp ground and dew; fly dope; mosquito netting; First Aid Kit.

#### BIBLIOGRAPHY.

- Jaeger, Ellsworth. WILDWOOD WISDOM. New York: The Macmillan Co.
- Mason, Bernard S. THE JUNIOR BOOK OF WOODCRAFT. New York: A. S. Barnes & Co.
- Pettit, Ted. BOOK OF NATURE HOBBIES. Didier Company.
- Handbooks. Campfire Girls, Girl and Boy Scouts.
- Leaflets.
- Cornell Rural School Leaflet. OUTDOOR LIVING.  
Extension Service, University of Massachusetts. OUTDOOR COOKERY. Leaflet No. 220. Amherst, Mass.

#### GENERAL BIBLIOGRAPHY.

#### TEACHER.

##### **Background Books.**

- Comstock, Anna B. HANDBOOK OF NATURE STUDY. Ithaca, New York: Comstock Publishing Co., Inc., 1941.
- Craig, Gerald S. SCIENCE FOR THE ELEMENTARY SCHOOL TEACHER. New York: Ginn and Company, 1940.
- Croxton, Walter C. SCIENCE IN THE ELEMENTARY SCHOOL. New York: McGraw-Hill Book Company, 1937.

##### **General Reference.**

- Allen, A. A. THE BOOK OF BIRD LIFE. New York: Van Nostrand, 1930.
- Babcock, H. C. FIELD GUIDE TO NEW ENGLAND TURTLES. Boston: Society of Natural History, 1938.
- Bolton, Rudyard. TRAVELING WITH THE BIRDS. M. A. Donahue & Co., 1944.
- Brown, Vinson. THE AMATEUR NATURALIST'S HANDBOOK. Boston: Little, Brown and Co., 1948.
- Buchsbaum, Ralph. ANIMALS WITHOUT BACKBONES. Chicago: University of Chicago Press, 1938.

- Ditmars, Raymond L. REPTILES OF NORTH AMERICA. New York: Doubleday, Doran and Co., 1936.
- FIELD GUIDE SERIES. New York: G. P. Putnam's Sons.
- Driver, Ernest. NAME THAT ANIMAL. Krausher Press.
- GARDEN ENCYCLOPEDIA. William H. Wise and Co.
- Graham, Edward H., and Van Dersal, William R. WILD LIFE FOR AMERICA. New York: Oxford University Press, 1949.
- Griscom, Ludlow. MODERN BIRD STUDY. Cambridge: Harvard University Press, 1948.
- Hegner, Robert. PARADE OF THE ANIMAL KINGDOM. New York: Macmillan, 1945.
- Henry, Marguerite. BIRDS AT HOME. M. A. Donahue & Co., 1944.
- Holland, William J. THE BUTTERFLY BOOK. New York: Doubleday, Doran & Co. THE MOTH BOOK.
- Hylander, Clarence J. OUT OF DOORS—4 volumes—SPRING, SUMMER, AUTUMN, WINTER. New York: Macmillan Co., 1942.
- THE WORLD OF PLANT LIFE. New York; Macmillan, 1944.
- Jaeger, Ellsworth. TRACKS AND TRAILCRAFT. New York: Macmillan, 1949.
- Palmer, E. Lawrence. FIELD BOOK OF NATURAL HISTORY. New York: McGraw-Hill Book Co., 1949.
- Peterson, R. T. HOW TO KNOW THE BIRDS. (Pamphlet). Mentor, 1949.
- Platt, Rutherford. THIS GREEN WORLD.  
OUR FLOWERING WORLD. New York: Dodd, Mead & Co.
- Westcott, Cynthia. THE GARDENERS' BUG BOOK. New York: Doubleday & Co. and American Garden Guild, 1946.

#### GENERAL BIBLIOGRAPHY, FOR TEACHER AND CHILDREN.

- American Forest Products Industries, Inc. TREES FOR TOMORROW.  
AMERICAN FORESTS.  
NEW MAGIC IN WOOD.  
Washington, D. C.: 1913 18th Street.
- Cope, J. A. FIFTY COMMON TREES. Cornell 4-H Club, Bul. 26. 1927.
- and Winch, Fred E. KNOW YOUR TREES. Cornell 4-H Club Bul. 85, 1948.
- Graves, George. TREES, SHRUBS, AND VINES OF THE NORTHEASTERN UNITED STATES. New York: Oxford University Press, 1945
- Hough, Romeyn B. HANDBOOK OF THE TREES OF THE NORTHERN STATES AND CANADA EAST OF THE ROCKY MOUNTAINS. New York: Macmillan, 1947.
- Limbach, Russell T. AMERICAN FORESTS. New York: Random House, 1942.
- Massachusetts Forest and Park Association. BRING THE FORESTS TO THE PEOPLE. Bul. 165, 1941. Boston: 3 Joy Street.  
TREES OF MASSACHUSETTS. Bul. 169, 1944.
- Rehder, A. MANUAL OF CULTIVATED TREES AND SHRUBS HARDY IN NORTH AMERICA. New York: Macmillan, 1940.

- Sargent, C. S. *MANUAL OF THE TREES OF NORTH AMERICA*. Boston: Houghton Mifflin, 1933.
- U. S. Department of Agriculture Yearbook. *TREES*. Washington, D. C., 1949.
- U. S. Department of Agriculture Soil Conservation Service. *TEACHING AID 111. SOIL EROSION AND WORLD HISTORY*. (also other publications). Upper Darby, Pa.
- Van Dersal, William R. *NATIVE WOODY PLANTS OF THE UNITED STATES: THEIR EROSION CONTROL AND WILDLIFE VALUES*. U.S.D.A. Misc. Pub. 303, 1938.
- West, James E. and Hillcourt, William. *SCOUT FIELDBOOK*. Boy Scouts of America, 2 Park Avenue, New York 16, N. Y., 1948.
- Wisconsin Conservation Dept. *SOME A B C'S OF CONSERVATION*. Madison, Wis.
- Watts, May T. *TREE FINDER*. Naperville, Ill.: Nature Study Guild, 1939.

### **Magazines and Periodicals.**

- AMERICAN FORESTS*, American Forestry Association, Washington, D. C.
- CANADIAN NATURE*. Canadian Nature, 177 Jarvis Street, Toronto, Canada.
- Palmer, E. Lawrence. *CORNELL RURAL SCHOOL LEAFLETS*. Ithaca, New York: New York State College of Agriculture, Cornell University.
- CURRENT SCIENCE*.
- CURRENT AVIATION*.
- JUNIOR NATURAL HISTORY*. Museum of Natural History, New York City.
- NATIONAL GEOGRAPHIC*. National Geographic Society, Washington, D. C.
- NATURE MAGAZINE*. American Nature Association. 1214 Sixth St., N.W., Washington, D. C.
- NATURAL HISTORY*. Museum of Natural History, New York City.
- OUR DUMB ANIMALS*. The Massachusetts Society for the Prevention of Cruelty to Animals. 180 Longwood Avenue, Boston, Massachusetts.
- POPULAR SCIENCE MONTHLY*. Popular Science Publishing Co., 353 Fourth Ave., New York.
- SCIENCE NEWS LETTER*. Science Service, Inc. 2101 Constitution Avenue, Washington, D. C.
- THE SCIENCE CLASSROOM*. Popular Science Publishing Co., 353 Fourth Avenue, New York.

### **Pamphlets, Bulletins, and Booklets.**

- (Sources of excellent material at little or no cost.)
- The National Wildlife Federation, Washington, D. C.
- Extension Service, Massachusetts State College, Amherst, Massachusetts.
- United States Department of Agriculture, Washington, D. C.
- Send for catalogues from various Biological Supply Houses.

### **Museums and Conservation Groups.**

- Note: When class requests material, send but **one** letter.
- Much help can be obtained from museums, both from visits and in some cases from materials loaned for use in the classroom. Teachers are urged to visit or write

to museums nearest them to see what material is available. Printed material may be available from the museum or from some group or society interested in conservation.

The Berkshire Museum, Pittsfield, Massachusetts.

The Children's Museum, 60 Burroughs Street, Jamaica Plain, Massachusetts.

Massachusetts Audubon Society, 155 Newbury Street, Boston 16, Mass.

National Association of Audubon Societies, New York City.

New England Wild Flower Preservation Society and the Massachusetts Horticultural Society, 300 Massachusetts Avenue, Boston, Mass.

Peabody Museum, Salem, Massachusetts.

Boston Science Museum, Boston, Massachusetts.

Worcester Natural History Society, 12 State Street, Worcester, Mass.

## CHILDREN.

Children's books are so numerous and varied and are changing so rapidly that we refer you to the CHILDREN'S CATALOG, compiled by Siri Andrews, Dorothy E. Cook, and Agnes Crowley, and published by the H. W. Wilson Company, New York.

### **Texts and General Reference for Children.**

Beauchamp, Wilber L. and others. LOOK AND LEARN.

ALL AROUND US.

HOW DO WE KNOW?

DISCOVERING OUR WORLD—Books 1, 2, and 3. New York: Scott, Foresman & Co., 1947.

Carpenter, Harry A., and others. ADVENTURES IN SCIENCE—Books 1-6. New York: Allyn and Bacon, 1947.

Craig, Gerald S., and others. OUR WORLD OF SCIENCE—Books 1-8. Boston: Ginn and Co., 1946.

Frasier, George W. and others. THE SCIENTIFIC LIVING SERIES—Books 1-6. Syracuse, New York: The L. W. Singer Co.

Knox, Warren and others. THE WONDERWORLD OF SCIENCE—Books 1-6. New York: Charles Scribner's Sons, 1946.

Parker, Bertha M. and others. THE BASIC SCIENCE EDUCATION SERIES. Row, Peterson and Co., Evanston, Ill.: 1944-1949.

Write State Teachers College, Fitchburg, Massachusetts, for additional material including Units of Work prepared and tried by teachers in the State.

**CHAPTER XVII.**

Page

**SOCIAL STUDIES.**

<b>Introduction</b> . . . . .	428
<b>Overview</b> . . . . .	432
Overview Chart for Intermediate Grades	
History and Geography Learnings.	
Map and Globe Understandings.	
Current Events.	
Living Together.	
How Children Learn to Live Together in the Classroom.	
How the Whole School Learns to Live Together.	
How the United Nations Is Working to Help All Peoples to Live Together Well.	
<b>Materials by Grades</b> . . . . .	448
Basic Units for Intermediate Grades.	
Conservation of Natural Resources.	
The Air Age.	
<b>Grade 4</b> . . . . .	456
Grade Overview Chart.	
Suggested List of Units.	
Sample Units.	
1. How the People in Our Town Worked Together to Make Our Community What It Is Today.	
2. The Development of Massachusetts. How People Seeking a Way of Living Established a New Type of Community. How Massachusetts Has Developed Into a Great Manufacturing Center.	
3. Our New England, Then and Now. . . . .	
4. How People Earn a Living by Manufacturing Goods.	
5. How People Travel and Transport Goods from One Community to Another.	
Audio-Visual Aids.	
Bibliography.	
<b>Grade 5</b> . . . . .	477
Grade Overview Chart.	
Suggested List of Units.	
Sample Units.	
1. How the United States Was Settled By Pioneers.	
2. Building Good Will Through an Understanding and Appreciation of the Negro.	
Audio-Visual Aids.	
Bibliography.	
<b>Grade 6</b> . . . . .	491
Grade Overview Chart.	
Suggested List of Units.	
Sample Units.	
1. How the People of the United States and Canada Work Together for Peace and Prosperity.	
2. Mexico and Her People, Good Neighbor to the South.	
3. Living in the Middle Andean Countries.	
Audio-Visual Aids.	
Bibliography.	

## INTRODUCTION.

Today we Americans are confronted with problems and issues affecting vitally not only our present way of living, but that of our future also. In education, as in other institutions, we face a world of change on every hand. Both constructive and destructive forces in science, discovery, invention, world politics, and economy have brought us face to face with problems entirely new to America.

In early America the children had a share in securing the necessities of life. Food, clothing, and shelter were provided through the co-operative effort of the home or the immediate community. Many of the processes essential to the maintenance of life were taught through first-hand experience. Economic, social, and industrial life was comparatively simple; and direct participation in the affairs of the home and community gave insight into and understanding of the social structure. This becomes impossible when processes are carried on behind closed doors or on the assembly lines inaccessible to the young.

Children of today, as of other generations, need interpretation of the social foundations upon which their civilization has been and still is being built. Whenever such learning is not provided elsewhere, it must be provided by the school. For this reason the social studies have become an essential part of the school curriculum, and because the years of formal schooling are relatively few, and the world in which the present immature generation must find its way is so complex, an attack by way of the social studies on the task of making that world meaningful must be made in the earliest grades.

It is important that whatever content or activities or experiences are selected as promising maximum child growth on any level, these must be within the range of the needs, interests, and abilities of the children on that level. It must be recognized that in any school or grade the range of interests, needs, and abilities will be very wide. Accordingly, any attempt to provide for the social adaptations of children on any level must, of necessity, include a great diversity of content and variety of experience to nurture the full spread of the growth needs.

As was suggested in an earlier paragraph, not only is there the problem of providing for present needs in a social environment; but we must also remember that this social environment is not static. It is dynamic, moving, changing. It becomes incumbent upon those who are planning a program to provide for growth in personal and social living that they seek some truths or principles around which to order and adapt content with changing application of such content to those principles.

Fortunately, among these enduring truths, many are within the understanding of children in the first six grades. They are not too immature to learn, on their level, for example, that

1. Our world is only a small part of the universe.
2. Man can change himself to make use of his environment.
3. Man can change aspects of his environment to meet his needs.
4. Control over nature brings a higher standard of living and an increased leisure time
5. Our world is a world of change.
6. At its best, our world is a world of law and order.
7. Our outlook on our world is democratic; our rights and privileges are limited only by the just rights and privileges of our neighbors.
8. In the past there have been and at present there are great and good and wise and brave people.
9. There have been and even now are evil, unwise, selfish, unheroic people.

These children are ready to learn, again on their level, that in order to live in a world where such truths rule



1. They must share experiences, must participate, sometimes by leading, sometimes by following.
2. They must co-operate in majority decisions.
3. They must express, in legitimate ways and at appropriate times, minority opinions.
4. They must obey the laws of any group of which they are a part; or they must take the consequences of disobedience.
5. They must face facts—even unpleasant facts—with courage and straightforwardness.
6. They must grow in mastery of the tools of learning.
7. They must develop an intelligent understanding of their neighbors, near and far.
8. They must come to know that progress is influenced by the great and good and wise and brave people of the past and the present as well as by those who have been evil and selfish and unwise.
9. They must come to know that geographic principles determine largely how groups of people live.

The whole field of social studies then may be thought of as including those experiences of man in his physical and social environment that have combined to produce the relationships, processes, movements, events, influences, and persons constituting the world in which we live. But some of these experiences have been constructive; some destructive. Some have made for understanding; some have hindered understanding. Some have made for friendship; some for antagonism. Out of this vast network of inter-relationships, we must sift such as will have meaning or can be made meaningful to children from six to twelve years of age.

Accordingly, for this group, the social studies may be thought of as those experiences with the physical and social environment that the individual has and through which he may be led to the knowledges, understandings, habits, skills, dispositions, and appreciations necessary for intelligent living in an ever-changing world and by means of which he may have continued success in the social studies throughout all the years of his schooling.

These experiences we must set into a framework of content that we can with fair assurance recommend as a safe and sane approach to the "socializing" of the children of the Commonwealth.

Dr. Howard Wilson states that, "for this age group the choice needs to be in terms of experience of the past and present with not too much emphasis on the problems that remain to be solved". It must provide for the needs of an immature individual seeking his place in society. It must take account of such principles as that the most economical learning takes place when the learner is actively pursuing purposes which are to him valuable and when such activity leads him on to further wholesome activity.

The most immediate, practicable, inclusive, and accessible statement of objectives basic to our task is that offered by the Educational Policies Commission on April 25, 1938, supplemented by its post-Pearl Harbor "Priorities in Education" in 1942.

The following is an attempt to interpret the objectives set up by the Educational Policies Commission into teaching-learning objectives for the social studies in Grades I through VI.

1. Self-realization: The child early becomes aware of himself as an individual with rights and duties toward himself, his home, his school, his church, his community, his state, his nation—even toward the larger world beyond our borders. He soon realizes that changes come to each individual. He very early needs to exercise his intelligence in thinking, listening, observing, investigating, and analyzing in order to meet the emergencies of contemporary living. He needs to select, organize, and use data for both personal and social purposes. He needs a sense of time, of space, of distance, of direction, of value.

2. Human relationships: The child early becomes aware of himself as a member of social groups; of himself as a human being needing to get along with other human beings having rights, responsibilities, and privileges equal to his own. He needs a wholesome understanding of and an active good will toward all groups, classes, races, and nations through a knowledge of the contributions made to society by such groups. He needs to recognize the interdependence of peoples and nations. He needs a sense of responsibility for co-operative action for the good of the group. He needs to grow in personal responsibility toward those whom he can help.

3. Economic efficiency: The child early becomes aware of the fact that he lives in a world where people must be working: producing, consuming, buying, selling, and transporting goods; earning, borrowing, lending, paying back money; communicating with each other; travelling from place to place by one means or another; keeping records; paying taxes and evaluating what they get in return. In this process of becoming aware of the work of the world, it is much to be desired that he develop an active appreciation of the resources, beauty, and wonders of the world and an understanding of how man's environment helps to determine his activities and his modes of living.

4. Civic responsibility: The child grows in awareness that in order to live in communities, all must obey laws. But part of that awareness is that he, in his small group, and his parents in their larger groups and through their elected representatives, have parts in making and enforcing those laws. He needs to grow into good citizenship. He needs to grow in the disposition to correct such unsatisfactory conditions as are under his control. He needs to understand and appreciate the contributions of the past to the present and the responsibility of the present to make its constructive contributions to the future.



**OVERVIEW CHART FOR INTERMEDIATE GRADES.**

AREAS OF GROWTH	MAJOR FIELD	GRADE IV
<p>HUMAN RELATIONSHIPS and SELF-REALIZATION</p> <p>Recognition of relationship to all other peoples through knowledge of the contributions to society made by all groups.</p> <p>Recognition of personal relationships and responsibilities.</p> <p>Recognition of the child's responsibility as a member of the group and the community.</p>	<p>HOW AND WHY PEOPLE SETTLE IN NEW PLACES.</p>	<p>SUBJECT MATTER AREA: OUR COMMUNITY, OUR STATE, and NEW ENGLAND.</p> <p>Explorers, early settlers, why and whence they came; effect upon our way of living today.</p>
	<p>HOW PEOPLE PROVIDE FOR THEIR HOME AND FAMILY LIFE.</p>	<p>Early settlers, home and family life compared with ours today.</p>
	<p>HOW PEOPLE OBTAIN AN EDUCATION.</p>	<p>Early schools and colleges in New England compared with ours. Present day schools and colleges in the area.</p>
	<p>HOW PEOPLE PROVIDE FOR THEIR HEALTH, PROTECTION, AND GENERAL WELFARE.</p>	<p>Health, welfare, and protection agencies in our own community. Our personal responsibility. Comparison of today with earlier days.</p>
	<p>HOW PEOPLE USE THEIR LEISURE TIME.</p>	<p>Recreational activities in New England: Travel, sports, and any others that arouse interest. Early recreation in New England.</p>
	<p>HOW DIFFERENT RACIAL AND NATIONAL GROUPS BENEFIT BY EXCHANGE OF IDEAS AND CULTURES.</p>	<p>Different groups represented in our community and in New England. Our gain through their music, customs, literature, etc.</p>
	<p>ECONOMIC EFFICIENCY.</p> <p>Recognition of how environmental influences and economic principles affect people's activities, history, control of environment to meet their needs, use of resources.</p>	<p>HOW ENVIRONMENTAL INFLUENCES DETERMINE GROWTH AND DEVELOPMENT OF NATIONS.</p>
<p>HOW PEOPLE EARN A LIVING.</p>		<p>Occupations of early settlers. Occupations of our own fathers. Ways of earning a living in New England.</p>

GRADE V	GRADE VI
<p>SUBJECT MATTER AREA: THE UNITED STATES OF AMERICA.</p> <p>Explorers, early settlers: why and whence they came, where they settled, how they influenced the development of the United States.</p>	<p>SUBJECT MATTER AREA: OUR NEIGHBORS TO THE NORTH AND TO THE SOUTH OF US.</p> <p>Alaska, Canada, Mexico, and the other Americas. Ancient civilizations. Explorers and settlers. Effect on present day countries.</p>
<p>Changes in home life from early colonies all over the United States to present; causes of change.</p>	<p>Home and family life in different environments. Similarities and differences in needs and activities.</p>
<p>Development of free public education in the United States. Importance of education in a democracy. Some study of different educational services.</p>	<p>Comparison of education with ours. Languages. Reasons for illiteracy in some countries. Current programs for improvement.</p>
<p>Health conditions in different regions and occupations. Story of development of health and safety services, especially those nation-wide. Causes of change since pioneer days.</p>	<p>Attention to general welfare. Health conditions. Contributions to medicine and research.</p>
<p>Discussion of leisure time activities, as interest leads. Growth of organized recreations, their purpose, value, and history. (All on fifth grade level only.)</p>	<p>Recreational and leisure time activities. Effect of climate, topography, living conditions, and tradition.</p>
<p>Our American Heritage of many cultures. First colonists English, Spanish, French, Dutch, with additions from all European and many Asiatic and African cultures. Our heritage of arts, customs, ideas, and loyalty of all.</p>	<p>World-wide contributions made by all peoples to one another. Sharing and pooling of ideas and resources. Distinctive cultures of peoples studied. Effect of air-travel.</p>
<p>Growth of United States as influenced by climate and topography. Control of environment. Use of resources. Commerce.</p>	<p>Influence of climate and topography on each area. Control of environment. Use of resources.</p>
<p>Study of industries in the United States. Development from early days to present.</p>	<p>Study and comparison of industries of countries studied with one another and with the United States.</p>

AREAS OF GROWTH (Continued)	MAJOR FIELD (Continued)	GRADE IV (Continued)
(ECONOMIC EFFICIENCY.)	HOW PEOPLE BECOME INCREASINGLY INTERDEPENDENT.	Self-sufficiency of early settlers, compared with interdependence of people today.
	HOW PEOPLE USE AND CONTROL THEIR NATURAL RESOURCES.	Conservation problems in our own community, especially in fire prevention, wild life, and other local needs; care of property, private and public. Extension to New England. Include pollution of water.
CIVIC RESPONSIBILITY.  Recognition of how people govern themselves and understanding that they must assume certain civic responsibilities.	HOW CITIES AND TOWNS GROW AND DEVELOP.	Influence of rivers, harbors, industry, etc., upon growth and development of cities and towns in Massachusetts and New England.
	HOW PEOPLE GOVERN THEMSELVES.	How democracy grew and developed. Mayflower Compact Bill of Rights, Declaration of Independence, Four Freedoms. Town Meeting, rule of majority, etc. Town and State Government.

GRADE V (Continued)	GRADE VI (Continued)
Growth of big and specialized industries of present as contrasted with earlier times. Relationship to transportation. Importance of air-travel.	Increasing interdependence of nations, with special application to Americas.
Use and care of national resources, especially forests, soil, minerals, water. Government conservation programs, regional and nationwide.	Natural resources and their use and control in each country. Our interest in them.
Origins and growth of our great cities. Factors causing growth. Importance of air-travel.	Origins and growth of cities and towns. Needs and occupations of people. Importance of air-travel.
Democracy—government of and for the people. Development since pioneer days. (1) colonial government; (2) independence; (3) union under constitution; (4) present procedures of national government. Famous statesmen.	Governments of countries studied. Alaska—a territory, perhaps later a state; Canada—one of the British Commonwealth of Nations; Mexico—a republic. Others. Pan-American Union. United Nations. Monroe Doctrine.

## HISTORY AND GEOGRAPHY LEARNINGS IN THE INTERMEDIATE GRADES.

The Social Studies in Intermediate Grades go beyond the objectives of the Primary Grades in that they help the child to widen his knowledge in the geography and history of our own country and of our neighbors in the Americas. It is recognized that understanding and a good attitude must be based on knowledge as broad and accurate as possible.

Since many teachers and administrators wish to have a definite statement of the history and geography learnings expected in each grade, the following lists are offered.

### GRADE 4.

LEARNINGS: PEOPLE LIVING IN THE COMMUNITY AND NEW ENGLAND—"THEN AND NOW".

HISTORY.	GEOGRAPHY.
The early settlers, where they came from, how they got here, and why they came.	<b>The Climate.</b>
<b>How people lived.</b>	How it affects people and their ways of living and working. How people dress in our community and in New England.
In homes. At work. By travel. By communication. In the valleys. Near the mountain areas. Where rivers were located. Where good harbors were found. Where forests grow.	<b>The Topography.</b>
<b>How people governed themselves.</b>	Rivers. Bays. Seas. Harbors. Mountains. Valleys. Islands. Peninsulas.
In towns. In cities. In states.	<b>The Natural Resources and the Need for Conservation.</b>
<b>How people were educated.</b>	Wild flowers. Forests. Water supply. Soil.
Early schools. Schools today. Famous New England colleges.	<b>The Industries:</b>
<b>How people provided for their health.</b>	Farming. Manufacturing. Lumbering. Arts and crafts. Fishing.



**GRADE 5****LEARNINGS: PEOPLE LIVING IN THE COMMUNITY, AND IN THE UNITED STATES—  
“THEN AND NOW”****HISTORY.**

The early settlers and explorers in the United States—who they were, why they came, where they came from, when they came, and how they traveled.

**People living in the United States, then and now.**

Their homes.  
Their work.  
Their means of travel and transportation.  
Their means of communication.

**People living in a growing country.**

The States.  
The Territories.

The Famous Events.  
Louisiana Purchase.  
Gold Rush—California.  
—Alaska.  
Missouri Compromise.  
Purchase of Alaska.

The Famous Inventions.  
Cotton Gin.  
Telephone, Telegraph.  
Sewing machine.  
Printing press.  
Electricity.  
McCormick's Reaper.  
Steamboat.  
Railroad.  
Automobile.  
Industrial machinery.  
Airplane.  
Radio.  
Television.

**GEOGRAPHY.****The Climate.**

How it affects the people and their ways of living and working.

**The Time Belts.****The Topography.**

Rivers.  
Mountainous areas.  
Great plains.  
Lowlands.  
Fishing grounds.  
Lakes.  
Harbors.  
Oceans.  
Valleys.

**The Use of Natural Resources.**

Mining of coal, metals, etc.  
Drilling for oil.  
Harnessing of water power.  
Tilling of the soil.  
Acquiring of products from the forests.

**The Industries.**

Farming.  
Manufacturing.  
Lumbering.  
Arts and crafts.  
Fishing.  
Tourist.  
Metal trades.  
Printing.

---

---

HISTORY.

The Famous People.

Presidents.

Governors.

Mayors.

Senators and Representatives.

Community Leaders.

Inventors.

Explorers.

Philanthropists.

The Government.

"A Democracy".

Town Government.

City Government.

State Government.

The United States Government

The United Nations.

---

---

**GRADE 6.**

LEARNINGS: PEOPLE LIVING IN OUR COMMUNITY, THE UNITED STATES AND THE AMERICAS—"THEN AND NOW".

**HISTORY.**

The early explorers and settlers in the Americas—who they were, why they came, where they came from, when they came, and how they traveled.

**People living in the Americas, then and now.**

Their homes.  
Their work.  
Their means of travel and transportation.  
Their means of communication.

Their adaptation to  
Mountain areas.  
Farming areas.  
Valley regions.  
Rivers and waterways.  
Harbors.  
Forest regions.  
Jungle regions.  
Polar regions.

Their cultures.  
Music and art of the Americas.  
Contributions of famous men and women of the Americas.

Their government.  
United States—Democracy.  
A.B.C. Republics of South America.  
Central America—Republics.  
Dominion of Canada.

Their education.

The Interdependence of the peoples of the Americas.

**GEOGRAPHY.****The Climate.**

How it affects the people and their ways of living and working.

**The Topography.**

Highlands.  
Lowlands.  
Rivers.  
Ports.  
Mountains.

**The Natural Resources.**

Great mining areas.  
Great farming areas.  
Great cattle raising areas.  
Natural scenic areas.

**The Industries.**

Mining.  
Fishing.  
Plantation—Sugar.  
—Rubber.  
—Cotton.  
Shipping.  
Manufacturing.  
Fruit raising.  
Hunting.

**The Zones—Latitude and Longitude.****The Time Belts.****The Effect of Winds, Ocean Currents, Rainfall.**

## MAP AND GLOBE UNDERSTANDINGS.

The social studies program should be directed toward developing the following map and globe understandings at the fourth, fifth, and sixth grade levels.

### GRADE 4.

The globe is a small true-scale model of the earth.

The map is a small scale, flat representation of the earth.

The earth is shaped like a sphere, except that it is slightly flattened at the poles.

The earth rotates on its axis, one day being required for one rotation. The rotation of the earth causes day and night.

Maps and globes show land and water areas.

Maps and globes show comparative distances.

The distance from the equator, north and south, helps to determine climate.

Maps and globes cannot be as large as the earth. Therefore, they are made to scale. Example: 1 inch represents a given number of miles.

### GRADE 5.

Symbols and color on maps show surface, rainfall, distribution of population, products, and natural resources.

The distances between places is found by using the scale of miles.

There are several different kind of maps, such as crop distribution, rainfall, surface, population distribution, and relief maps.

### GRADE 6.

Maps and globes show longitude and latitude. Longitude is used to calculate time, and longitude and latitude are used to locate places.

Countries may be located on maps and globes in relation to the equator, tropics, circles of latitude and longitude, poles, water bodies, other countries, and continents.

Maps show different time zones. There are different time zones in the United States.

Weather maps are essential in modern living.

Maps show tropical regions, polar regions, and surface areas, and the regions and surface areas influence man's ways of living.

Some maps show highways, — local, state, country, and continental.

## CURRENT EVENTS.

Discussion of current happenings is an important part of the social studies program. Today's happenings are of interest and importance to boys and girls. To begin a day's program with the on-going experiences of the community, state, and nations, is one of the best means to arouse curiosity and interest in social and world problems. Newspaper clippings, periodicals, picture displays, weather maps, radio broadcasts, current moving pictures, discussions, forum programs, and carefully planned bulletin board displays are excellent aids in the current events program. Wise use of these aids should help a teacher to direct reading activities of individual pupils and groups: to develop the ability of the children to evaluate modern activities, to develop the ability of pupils to withhold judgments until all facts are presented and understood.

Discussion and study of current happenings should aid in developing a social consciousness, an interest in the timely events which are influencing today's living, and a better approach to and understanding of the problems of the people of the world today.

"Many excellent units of study have resulted from a morning discussion of a current affair."

## LIVING TOGETHER.

### HOW CHILDREN LEARN TO LIVE TOGETHER IN THE CLASSROOM.

#### I. GENERAL STATEMENT CONCERNING DEMOCRATIC LIVING.

It is the school's responsibility to help children learn how to live together well. It can accomplish this, as has been previously stated in this Guide, by insuring those fundamental understandings, skills, habits, attitudes, ideals, and appreciations necessary for living in a democratic society. Numerous opportunities will arise by having classrooms become laboratories of democratic living.

#### II. EXAMPLE — HOW A FOURTH GRADE TEACHER DEVELOPED DEMOCRATIC LIVING WITH CHILDREN IN THEIR OWN CLASSROOM. (Report from Mildred S. Crocker, Needham Public Schools).

During the early part of the school year we study the beginnings of America, especially the settlement of New England. We discuss the way in which the Pilgrims drew up the Mayflower Compact, the establishment of the Massachusetts Bay Colony, and the organization of the General Court. We discuss how they wished to form a government that would be for all the people and not for just a few. We talk about the planning which was done before the Pilgrims left the Mayflower, how the pact was signed, how the leaders were chosen, and how the plans were carried out once they were ashore. This leads very naturally into a discussion of leaders and how one knows who will make a good leader. We talk about the government formed by the Massachusetts Bay Colony and analyze it for meeting the needs of all the people. Then we set up government for our own room in which we select leaders, organize groups, discuss common problems, reach decisions, and carry out standards set up by the group.

Officers are elected for the room, President, Secretary, Treasurer, Council Members, Decorators, Librarians, etc. A Governor is elected. Meetings of all room members are held every Friday, though sub-meetings are held as frequently as necessary by various groups. At the Friday meetings problems that have not been solved by the groups during the week are brought up for discussion and settlement. No problem is discussed or settled by the teacher unless it is first brought up before the entire room.

Some problems that might be brought up are: How can we make our room more attractive? How can we act in the building so that visitors to our building would know that we were proud of our school? What can we do to be better sports on the playground? What can we do to help members in each group act as they should? When complaints are made against individuals, that person has a right to defend himself. Decisions are arrived at by the group for his behavior and are tried out for one week. Usually it is not necessary to bring it up again because the individual abides by the decision made by the group.

In this way children learn that it is not always easy to have good government as much as they might wish to have it be good. Sometimes the leaders elected are not what they expect them to be; sometimes things do not turn out as they might expect them; and sometimes other people do not understand what they are trying to do. They become more conscious of the qualities of good leadership. They begin to understand that only by continuous trial and error do we get perfection in anything. They find that a good government does not cater to one class of people, or group, etc. They grow in dependability, cooperation, ability to live well and to play well together. They consider the opinions of others and learn that all have a right to their own beliefs. They learn to settle things by arbitration rather than resorting to quarreling and fighting.

Suggested procedure for classroom meeting:

1. Set up standards for good leaders or representatives.
2. Standards of behavior for leaders.
3. Standards for reports.
4. Standards of class responsibility when reports are read.
5. Class meetings.
  - a. Report of chairman, leaders, etc.
  - b. Discussion of reports.
  - c. Evaluation of leaders' work.
  - d. Discussion of problems presented in reports.
  - e. Instruction for further action by leaders.
  - f. Evaluation of class participation in meetings.

III. SUGGESTIONS OF CLASSROOM OPPORTUNITIES FOR EXPERIENCING DEMOCRATIC LIVING.

**A. Good democratic standards for selecting leaders or representatives.**

Sample Opportunities	Standards for Behavior
<ol style="list-style-type: none"> <li>1. Electing a librarian.</li> <li>2. Choosing someone to order and deliver milk.</li> <li>3. Representative to Safety Council, etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. List of qualifications needed for a specific job.</li> <li>2. Look for suitable candidates for the job.</li> <li>3. List reasons why candidates would be suited for job.</li> <li>4. Vote only for a person who best meets the qualifications.</li> <li>5. Vote with heads, not with feelings.</li> <li>6. Vote for what is best, no matter how others vote.</li> </ol>

**B. Good democratic standard of leadership during a term of office.**

<ol style="list-style-type: none"> <li>1. What are the duties of the room presidents?</li> <li>2. What should our classroom librarian try to remember?</li> <li>3. What should our representatives try to remember?</li> </ol>	<ol style="list-style-type: none"> <li>1. Know what is expected on the job.</li> <li>2. Know why elected.</li> <li>3. Set a good example for others to follow.</li> <li>4. Attend meetings regularly and on time.</li> <li>5. Understand that good leaders are not "bossy."</li> <li>6. Listen to suggestions of others.</li> <li>7. Treat all people fairly.</li> </ol>
--	--

8. Think of ways to make own room and own school good room and good school.
9. Be proud to be an American.

**C. Good democratic standards of followership in support of those elected.**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. What can we do if those elected do not do a good job?</li> <li>2. How may we help leaders to make job easier?</li> </ol> | <ol style="list-style-type: none"> <li>1. Help those elected to do a good job.</li> <li>2. Co-operate with those elected.</li> <li>3. Support and obey rules of the group.</li> <li>4. Help the team by doing own part.</li> <li>5. Try to do what is right, no matter what others do.</li> <li>6. If those elected do not do a good job, let them know what is expected of them or replace them with those who will do a good job.</li> <li>7. Be proud to be an American.</li> </ol> |
|--|--|

**D. Good democratic standards for practicing duties and responsibilities toward others while around and about the playground.**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. How can we all have a good time on our playground?</li> <li>2. How may we improve our playground in summer and in winter?</li> <li>3. Do we always have to do what HE says?</li> </ol> | <ol style="list-style-type: none"> <li>1. Play carefully so as not to tear clothing of others.</li> <li>2. Refrain from fighting right away when things go wrong.</li> <li>3. Remember that playground is not the place for dangerous playthings.</li> <li>4. Remember that playground is not the place for snowballs.</li> <li>5. Allow other people to have their way some of the time.</li> <li>6. Call people by their right names.</li> <li>7. Help to keep playground clean.</li> <li>8. Think before acting or speaking.</li> <li>9. Allow others the same playground privileges that we wish for ourselves.</li> </ol> |
|--|--|

**E. Good democratic standards for practicing duties and responsibilities towards others while moving about the building.**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Coming into school.</li> <li>2. Going to enjoy a program in auditorium.</li> <li>3. Going to basement.</li> <li>4. Going to get supplies.</li> <li>5. Going on errands.</li> </ol> | <ol style="list-style-type: none"> <li>1. Go to and from the room quietly.</li> <li>2. Go to the basement without being watched or checked.</li> <li>3. Walk about the building quietly.</li> <li>4. Talk quietly in the halls, in the basement, and on the stairs. Walk on the stairs.</li> <li>5. Keep to the right when passing others.</li> <li>6. Help to keep the halls and stairways clean and neat.</li> <li>7. Remember to open and close doors quietly.</li> <li>8. Be trustworthy wherever we go.</li> </ol> |
|--|---|

**F. Good democratic standards for practicing duties and responsibilities toward others while working in the room.**

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. A reading group is disturbed by children who are not quiet at seats.</li> <li>2. The room is not neat after art activities.</li> <li>3. An activity can not be started because some children are not ready.</li> </ol> | <ol style="list-style-type: none"> <li>1. Go to and from one group to another quietly.</li> <li>2. Move chairs quietly.</li> <li>3. Use materials quietly.</li> <li>4. Refrain from disturbing others by unnecessary talking.</li> <li>5. Laugh quietly.</li> <li>6. Do own work.</li> <li>7. Clean up after ourselves.</li> <li>8. Be ready for class on time.</li> <li>9. Get things we need to work with without being told.</li> <li>10. Make good use of school time all the time.</li> <li>11. Get ready quickly and not delay others.</li> <li>12. Take care of ourselves when teacher is out of the room.</li> </ol> |
|--|--|



**C. Good democratic standards for practicing duties and responsibilities regarding the property rights and privileges and others.**

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. A borrowed book has not been returned in time for owner to use it.</li> <li>2. Erasers and pencils.</li> <li>3. Materials are being borrowed from an absent child's desk.</li> <li>4. A complaint comes from a school neighbor because of trespassing.</li> </ol> | <ol style="list-style-type: none"> <li>1. Return things promptly that we borrow.</li> <li>2. Leave things alone that do not belong to us.</li> <li>3. Keep hands out of other children's desks.</li> <li>4. Ask permission before we use the property of others.</li> <li>5. Take care of furniture without scratching it.</li> <li>6. Leave desks and chairs in neat position.</li> <li>7. Respect the property of others.</li> <li>8. Think of comfort of others before we open a window.</li> <li>9. Use care when handling things that belong to others.</li> </ol> |
|---|---|

**H. Good democratic standards for practicing duties and responsibilities toward others when using materials and equipment.**

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Where shall we keep our supplies so we may obtain them easily?</li> <li>2. How can we share our story books?</li> <li>3. Shall we rehearse every day in the auditorium?</li> </ol> | <ol style="list-style-type: none"> <li>1. Be thrifty with materials.</li> <li>2. Share things with others.</li> <li>3. Leave materials shared with others in a convenient place.</li> <li>4. Put things back where they belong.</li> <li>5. Return library books on time.</li> <li>6. Leave materials in the condition we should like to receive them.</li> <li>7. Leave desks and chairs in position.</li> </ol> |
|--|---|

**I. Good democratic standards for practicing duties and responsibilities toward others when participating in discussions.**

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Evaluating answers to questions asked during a reading lesson.</li> <li>2. Evaluating data secured.</li> <li>3. How shall we go about finding information about early explorers?</li> </ol> | <ol style="list-style-type: none"> <li>1. Take a helpful part in class discussions.</li> <li>2. Think before we speak.</li> <li>3. Speak only when someone else is not talking.</li> <li>4. Speak distinctly so all can hear.</li> <li>5. Be courteous when we disagree with what someone else has said.</li> <li>6. Give helpful, constructive suggestions to others.</li> <li>7. Listen attentively when others are speaking.</li> </ol> |
|---|--|

## HOW THE WHOLE SCHOOL LEARNS TO LIVE TOGETHER.

### A School Activity for Actual Practice in Democratic Principles.

"Today we are faced with the pre-eminent fact that if civilization is to survive, we must cultivate the science of human relationships . . . the ability of all peoples of all kinds to live together and work together in the same world at peace." — Franklin Delano Roosevelt.

The understandings, attitudes, appreciations, habits, and skills which will aid in realizing this broad objective must begin in the early years of child training. These objectives are not going to be achieved through courses and subjects offered on any level but rather through training in better human relationships and good citizenship which must permeate every part of the program. Only when the pupil lives democratically can he understand democracy. Some activities contribute a great deal more than others. A Student Council, even in the elementary grades, can go far in developing these attributes of good citizenship. It brings the children of all ages together to work for the common good of all. It provides an opportunity for teacher and pupil committees to work together thus helping each gain a better understanding of the other's problems, difficulties, and pleasures. As a pupil member serving on a Steering Committee which did the ground work in organizing a council said, "We have a good school but we can make it even better if we all co-operate."

The council acts in an advisory capacity. It does not make laws for it has no power to enforce them. It does, however, have the power to suggest, to plan, to carry out and evaluate suggestions and plans.

### THINGS TO UNDERSTAND.

1. Complete support of and allegiance to family, school, community, and nation are required for good citizenship.
2. Rights and privileges in a democracy are accompanied by duties and responsibilities.
3. Rights and privileges are not limited by faith, color, or nationality.
4. Democracy requires the yielding of certain rights and privileges for the good of all.
5. Laws and regulations are made to be observed.
6. A good citizen is well informed and interested in current happenings in his own community, state, nation, and world.
7. Acceptance of the will of the majority is necessary.
8. The voice of the minority must be heard and considered.
9. Leaders should be chosen for their qualifications of leadership and good citizenship.
10. Successful democracy depends upon good leaders and good followers.
11. It is a privilege and obligation of the citizen to vote intelligently and wisely, always striving to choose good leaders.
12. In a democracy the opinion of the individual may be voiced either directly or through his duly appointed representative.
13. The good citizen observes the Golden Rule in his social, religious, political, and economic life.

### THINGS TO DO.

1. Hold meetings of the steering committee to determine
  - What is the purpose of a student council?
  - Who shall be the representatives?
  - Who shall be the officers?
  - How shall the officers and representatives be chosen?

2. Hold election of officers and representatives in various rooms.  
Hold primaries for choosing nominees in sixth grade rooms.  
Campaign for offices.  
Prepare speeches.  
Hold assembly to present speeches.

Conduct elections at central polling place set up as nearly like the regular polls as possible.

3. Conduct regular council meetings according to parliamentary procedure.

#### THINGS TO TALK ABOUT.

1. Organization of a safety patrol.
2. Making a school code.
3. Handling the snow-ball situation.
4. Courtesy in halls and auditorium.
5. Care of school property and appearance of building and playground.

#### EVALUATION.

In terms of changes in pupil behavior and general attitude.

#### SOURCES FOR INFORMATION AND FURTHER SUGGESTIONS.

Mahoney, John J. FOR US THE LIVING. New York: Harper & Brothers, 1945.

Schneidman, Rose. DEMOCRATIC EDUCATION IN PRACTICE. New York: Harper and Brothers, 1945.

The National Elementary School Principal. ELEMENTARY SCHOOLS. THE FRONT-LINE OF DEMOCRACY. Twenty-Second Yearbook, National Education Association, 1943.

### **HOW THE UNITED NATIONS IS WORKING TO HELP ALL PEOPLE LEARN TO LIVE TOGETHER WELL.**

#### THINGS TO UNDERSTAND AND TALK ABOUT.

1. We live in one world with people who are interdependent regardless of race, culture, or advancement.
2. People in other lands seem strange to us because we do not know them.
3. We must have a sympathetic understanding of other peoples as the first step in an enlightened world citizenship.
4. Children of all people everywhere have the same basic needs.
5. Swift transportation of today has brought all people closer together and made our big world seem smaller.
6. Instances of neighborly understanding, neighborly interdependence, and neighborly helpfulness between countries are important.
7. Most people on earth usually do as well as they can with the materials that they have available. They are eager to adopt inventions introduced by visitors from more advanced countries. The acceptance of medicine everywhere is an example of this.
8. Contented people do not wish to fight. If we can develop an understanding of the problems of people in other countries we have taken a step in this direction of peace since "peace is made in the minds of men", and our thinking affects other people.

### THINGS TO DO.

1. Discuss the meaning of the word "united" many working as one, many nations working and living together as one.
2. Make a display of United Nations flags.
3. Arrange a bulletin display.
4. Exhibit dolls of many lands.
5. Invite members of the League of Women Voters to discuss the work of the United Nations with the class.
6. See films on the United Nations.
7. Write to "pen pals" from other countries and share letters with classmates.
8. Collect stamps from other countries.
9. Discuss the purpose of the United Nations and why there is a need for such an organization.
10. Discuss the Declaration of Human Rights and its significance.
11. Read articles, stories, books.
12. Discuss ways that our world has become smaller since the days of the early settlement of America. Transportation, communication, motion pictures, etc.
13. Sing songs and dance the folk dances of other countries.
14. Play the games that are popular with other children.
15. Make a comparison of the early struggle of the thirteen colonies for freedom and the present struggle of man to form a world government.

### SOURCES OF INFORMATION.

United Nations Association Center, 355-A Boylston St., Boston 16, Mass.

AIDS TO TEACHING ABOUT THE UNITED NATIONS. N. E. A.

EDUCATION FOR INTERNATIONAL UNDERSTANDING. N. E. A.

INTERNATIONAL UNDERSTANDINGS RESOURCE KITS FOR ELEMENTARY TEACHERS.

State of Kansas, Department of Education.

A BETTER WORLD. New York City Board of Education, 110 Livingston St., Brooklyn, New York.

EVERYMAN'S UNITED NATIONS. Funk and Wagnalls Co., New York.

Fisher, Lois. YOU AND THE UNITED NATIONS. Chicago: Children's Press, Inc. Throop and Monroe Streets, Chicago 7.

Whitty and Kohler. YOU AND THE CONSTITUTION OF THE UNITED STATES. Chicago: Children's Press, Inc.

Lewellen, John. YOU AND ATOMIC ENERGY. Chicago: Children's Press, Inc.

GLOBE VIEW. Reports on the U. N. and Peoples of the Earth. New York: Association for Arts in Childhood, Inc., 518 West 121 Street, New York 27.

THE UNITED NATIONS AND YOU. New York: American Association for the U. N. Education Department, 45 East 65th Street, New York 21.

### MATERIAL BY GRADES.

**Basic Unit for Intermediate Grades: Conservation of Natural Resources: Why and How.**

GENERAL NOTE: The study of conservation in the intermediate grades is a continuing

topic. It may be handled in any grade (1) as one large unit, (2) as several small units, or (3) as phases of the study of geography and science. The material in this general unit should not be repeated year after year; rather, the study in any year should arise from, or be correlated with, current experience and study.

**Special grade emphases are indicated as follows:**

**Grade 4.** The conservation problems in this grade should be those which can be studied locally, and those which affect New England. Emphasis might be upon fire damage (in town and forest); improper destruction of our wild animals and plants; water pollution; and perhaps others of timely interest.

**Grade 5.** In this grade the major natural resources of the United States may be listed, located, and studied either systematically or incidentally. What do they mean to our national economy? What is being done, and what should be done, to conserve them? Emphasis might be on soil, forests, minerals, animals, and others of current interest. Correlate with a study of industries.

**Grade 6.** The natural resources of the Americas, their development nationally and internationally, the interdependence of countries, and the relationship of the Americas with the rest of the world may be studied in this grade. According to the background and maturity of the class, these topics and others in economic geography and economic history can be considered, including the results of proper development and exploitation.

**BACKGROUND MATERIAL FOR THE DEVELOPMENT OF ALL UNITS IN CONSERVATION.  
THINGS TO UNDERSTAND.**

1. "Conservation" means the opposite of "waste."
2. Natural resources are those useful things which we could not make ourselves; examples, plants, animals, minerals, water. We could not possibly live without them.
3. Although we cannot make our natural resources, we can destroy them by being careless, and we can keep them and sometimes increase them by being careful.
4. The problems of soil, water, plants, and animals are all interrelated.
5. Soil is often worn out, washed away, or blown away.
6. Forests are destroyed by pests, over-cutting, or fire.
7. Rivers, small or large, are polluted, rendered unfit for navigation, and are not used to advantage.
8. Water conservation is important in many parts of our country.
9. Animals, including birds and fish, are often destroyed by over-hunting, and change of physical conditions.
10. Useful and ornamental plants disappear when over-picked or carelessly destroyed.
11. Minerals are lost through wasteful handling and manufacture, and through widespread lack of care.
12. Our natural resources have become seriously depleted. They can be restored only by careful planning over a long period of time.
13. The government (local, state, and national), private agencies, and individuals are working to improve conservation.
14. Conservation is everybody's business. Our prosperity depends upon it.

**THINGS TO TALK ABOUT.**

1. Local conservation problems and agencies; examples, fire hazards and damage in town, fields, and woods, together with fire prevention and means of extinguishing, also recall

of study of fire department from previous grade; local wild animals, fish, birds, and plant life, including trees, local game and fish laws, care of desirable plants and animals, and control of weeds, insect pests, and plant diseases, Sportsmen's Clubs, civic associations, forestry and agricultural agents; any local problems in water conservation.

2. State and New England problems and agencies in conservation; examples: rivers, lakes, and harbors, their uses for power, fishing, navigation, transportation, irrigation, and water supply, and the problems of cleanliness, dredging, flood control, etc., involved in keeping them usable; work of government and of private agencies and industries; care of natural beauties of Massachusetts and New England, state forests and parks, and work of such agencies as Massachusetts Audubon Society; New England Wildflower Preservation Society, Massachusetts Forest and Park Association, and Massachusetts Conservation Council; work of state universities in research and supervision.

3. National conservation of forests: waste of lumber; effects of deforestation on land, water, and wildlife; dependence of certain industries on lumber; work of national forestry service and plans for care and increase of forests.

4. Care and use of natural beauties of our country: the National Parks, state and private encouragement of tourist travel.

5. Soil conservation: important not only to farmers but to all food industries; soil composition and formation; depletion of soil value through over-use and wrong use; erosion by wind and water, causes and prevention; methods of saving and increasing soil value through irrigation, contour plowing, terracing, proper planting, fertilization, etc., work of national Department of Agriculture, and of manufacturers of farm machinery.

6. Minerals: lists of minerals used, and of the industries dependent upon them; wasteful and economical methods of mining, refining, manufacture and use.

7. Water: problems of the rivers, lakes, and harbors of the United States, with special reference to the great industries involved.

8. Effects of local waste and destruction upon economic and social life of local people; effects of waste anywhere in the United States upon all other people.

9. Resources of our neighbors in the Americas; our dependence upon one another for raw materials; proper development vs. exploitation of natural resources. See note under Grade 6.

#### SOME TYPICAL QUESTIONS.

1. What industries are dependent on the natural resources of New England?
2. How would the forest lands in Massachusetts compare with those of the early colony? Is that good or bad?
3. How is oil secured? Could it be secured and used more economically (on a large scale)?
4. With what necessities of life does the soil provide us? Are there any problems of soil conservation in my own town?
5. Has deforestation affected our town water supply?
6. Is our city sewage and factory waste (or that in the nearest city) safely destroyed?
7. What can we do to prevent fires?
8. What can we do to help care for and control desirable and undesirable plants, animals, birds, and insects?
9. What is done about flood control?
10. What is the purpose of such great dams as Boulder Dam and others? Are there any dams in or near my town?
11. What was the "Dust Bowl"? What caused it, and what effect did it have?

## THINGS TO DO.

Note: These activities may be carried on as part of an independent unit on conservation, or they may be adapted for use in connection with other social studies or science units.

1. Make a trip to a field or plowed lands, or even along the streets after a heavy rain, to see the muddy water, sheet and gully erosion, silt at the foot of a slope, etc. Visit a brook or river to see whether the water is carrying soil, and, if possible, where it is deposited. Find out whether the water in the brook or river is contaminated with sewage or other waste.

2. Build models, or make diagrams, showing the effects of erosion. Experiment with different kinds of soils to see which hold water, or fail to absorb it, or are easily washed away. Make models or diagrams showing different devices for holding the soil. Study the effect of grass, cover crops, brush patches, and trees.

3. Watch and demonstrate wind erosion.

4. Study in the classroom and observe in the field the various forms of wildlife in the vicinity. Make lists and scrapbooks of the useful and harmful plants and animals. Visit a nearby fish hatchery, game preserve, or bird refuge. Ask a representative of one of the conservation groups (see Things to Talk About, 1 and 2) to speak to the class.

5. Observe trees in different stages of growth, from the seed to maturity.

6. Study and collect different ways in which manufacturers try to utilize every bit of a product. If feasible, visit a manufacturing plant that shows this.

7. Make scrapbooks, murals, maps, graphs, etc., showing the natural resources of different parts of our country and of the Americas, and their interrelation.

8. Plan for, and take part in, all sorts of local conservation activities, and report from time to time. Keep individual or class charts showing what is planned and what is done. Have a culminating program.

9. Read, collect, draw, see films, make bulletin board displays, and in all ways collect and record information about conservation.

## BIBLIOGRAPHY.

Fink, Ollie E. THE TEACHER LOOKS AT CONSERVATION AND NATURAL RESOURCE. Ohio Division of Conservation and Natural Resources.

Gable, Charles H. TEACHING CONSERVATION. Washington, D. C.: American Nature Association.

Craig. SCIENCE FOR THE ELEMENTARY SCHOOL TEACHER. Boston: Ginn and Co.

Butler, O. M., ed. AMERICAN CONSERVATION IN PICTURE AND IN STORY. Washington, D. C.: American Forestry Association.

"Teaching Conservation in Elementary Schools." Bulletin, 1938, No. 14. Washington, D. C.: U. S. Office of Education.

"Curriculum Content in Conservation for Elementary Schools." Bulletin, 1939, No. 14. Washington, D. C.: Office of Education.

"Conservation Excursions." Bulletin 1939, No. 13. U. S. Office of Education.

Basic Science Educations Series. New York: Row, Peterson and Co.

"Plants 'Round the Year."

"Water."

"Animals 'Round the Year."

"America's Minerals."

"Man's Use of Plants and Animals."

"America's Oil."

"Soil."

"Soil, Water, and Man."

"Saving Our Wildlife."	"Our American Forests."
"Fire."	"Fire, Friend or Foe."
"Plant Factories."	"Balance in Nature."
"Clouds, Rain, and Snow."	"Stories Read from the Rocks."
"Trees."	"Animals of Yesterday."
"The Earth A Great Storehouse."	"Life Through the Ages."

Unit Study Books. American Education Press.

- No. 106. "Farm Animals."
- No. 104. "Plants for Food."
- No. 454. "Soil: Sources and Uses."
- No. 352. "Protection in Nature."
- No. 555. "Balance in Nature."

Pack, Charles L. THE FORESTRY PRIMER. American Tree Association.

"Would You Have Liked to Live When?" National Wildlife Federation  
Nature Magazine. American Nature Association, Washington, D. C.

Blough, Glenn O. WATER APPEARS AND DISAPPEARS. New York: Row, Peterson  
and Co.

Pryor, William. WATER — HEALTH OR WASTE. New York: Harcourt, Brace & Co.

"What Is Soil Erosion?" U. S. Department of Agriculture, Misc. Pub. 286.

"Raindrops and Muddy Rivers." National Wildlife Federation, Inc.

Publications of the U. S. Department of Agriculture.

- a. MP-486 — "Teamwork to Save the Soil."
- b. MP-394 — "Farms the Rains Can't Take."
- c. "From Ridge to River."
- d. "The Land We Defend."
- e. "A Heritage We Guard."

"Nature's Bank, The Soil." Wildlife Federation, Inc.

"Soil Conservation". Magazine of the Soil Conservation Service, U.S.D.A.

Brinser, Ayers and Ward Shepard. OUR USE OF THE LAND. New York: Harper and  
Brothers.

Publications of the U. S. Department of Agriculture:

MP-321 — "To Hold This Soil."

Lowdermilk, W. C. — LESSONS FROM THE OLD WORLD TO THE AMERICAS ON  
LAND USE.

Bennett, H. H. — ACRES ARE ACES.

#### AUDIO-VISUAL AIDS:

Motion Pictures: A number of motion pictures, both sound and silent, 16 mm. and 35 mm., are available from various agencies of the Federal Government and from some State Departments of Conservation. Federal agencies include The Soil Conservation Service, the Forest Service, the Fish and Wildlife Service. Several farm machinery manufacturers and other commercial concerns have some good recent motion pictures.

Film strips, lantern slides, charts, and posters are also available from the same sources.

Popular Science Publishing Co., New York.

CONSERVATION IS EVERYBODY'S BUSINESS. Four colored film-strips with Teaching  
Guide. Topics: People, Soil, Forests, Water.



## BASIC UNIT FOR INTERMEDIATE GRADES: THE AIR AGE.

GENERAL NOTE: The study of the air age and air travel constantly recurs throughout the intermediate grades. Its major emphasis may well come in Grade 6, since the study of the Americas and the science unit on air-craft are both placed in that grade. However, it may be used wherever indicated, or parts of it may be correlated with other units.

### Special grade correlations are indicated as follows:

**Grade 4.** Air lines and planes are important in Massachusetts and in New England. Massachusetts has at least three large airports. Find out about the travel and trade services within New England, and those that reach out into other regions. Under transportation in New England study air transportation. List the local uses of air service.

**Grade 5.** Treat air services in the United States in the same way. Emphasize what air service has done for travel and trade between the two coasts, and how it linked us with Europe and with Asia. Mention the effect on our industries.

**Grade 6.** According to the general plan, the major unit will occur here. Emphasize the long range use of air services; use the globe freely in establishing routes; emphasize the use of the airplane in reaching and perhaps developing country hitherto inaccessible. Correlate with science, and go as far as class interest and ability indicate.

### THINGS TO UNDERSTAND.

1. The growth in air transportation has been tremendous and has been accomplished in a very short time.
2. The airplane is capable of an enormous number of services.
3. Speed and efficiency of travel have made neighbors of all nations.
4. Ease of travel increases man's opportunity to see and appreciate his earth.
5. Government regulation is essential to safe and efficient air transportation.
6. Rapid transportation is a social problem which very definitely affects every individual pattern of life.
7. Many men of many countries contributed their knowledge in man's conquest of the air.
8. The operation of an efficient and safe air transportation service requires many highly trained people.
9. To build, and run a large airport requires careful planning and considerable money.
10. The airplane must be used for peaceful ends if we would preserve our civilization. Nations must co-operate in charting and controlling airways, if real progress is to be made.
11. The airplane has brought about changes in industry. Ground and water transportation is being re-adjusted. The manufacture of airplanes is a huge industry. The training of personnel is on a large scale. The exchange of goods, and the consequent location of industries, is much changed.
12. The airplane has brought about changes in individual and group life-patterns. Many occupations have been affected; e.g., pilots, hostesses, mechanics, navigators, radio operators, and meteorologists are needed in increasing numbers, besides the workers in and about the shops and airports. Centers of population are changing. Isolated places are being opened; e.g., travel in the Arctic regions is being revolutionized.
13. The development of the airplane has changed and stimulated new studies and inventions in science and geography. There are many cases in which other industries and people

have profited by these forward steps. For instance, farmers, fishermen, merchant ships, and many others benefit from our greater knowledge of weather. All profit from the better maps and knowledge of the whole world. Better fuels, engines, radio, radar, are universally useful.

14. All countries are near us. Any part of the world can be reached in a few hours.

#### THINGS TO TALK ABOUT.

1. Who made the first flight in an airplane? In a balloon? Who first flew the Atlantic?
2. How many different kinds of airplanes are there and what is each used for?
3. How fast do planes go?
4. Did a person living 100 years ago have the opportunity to see and know as much about other countries and people as I am likely to have?
5. Are there many plane crashes?
6. Does the airplane help many people in my town? In what ways?
7. Who invented the first balloons and planes, and what makes them fly?
8. What are some of the jobs open in aviation?
9. What facilities do they have at large airports, and who owns them?
10. How many bombs and how far can a plane fly?
11. When we hear about the weather, over the radio, where does the information come from? How is it gathered? What is a weather map?
12. What farmers near us really use the weather information? How? What other people all over the Americas?
13. How do airplanes take off and land on a big airport?
14. How are jet-planes different, in plan and performance? What does that mean for possible future development?

#### THINGS TO DO.

1. Make a display of pictures of planes with the dates they were used. Get a book loan of aviation stories from the library.
2. Read stories such as "Smoke Jumpers" in PEOPLE AND PROGRESS.
3. Write for time tables from several airlines and compare the time it takes to travel to various places.
4. See motion pictures such as "Wings to Ireland", and other travel films put out by airlines. Make travel posters.
5. Make a bulletin board display of newspaper clippings of recent plane crashes. Have a debate on which is safer—planes or cars? Collect all information from as many sources as possible.
6. Interview people who use airplanes in the town. Tell about any plane rides that members of the class may have taken.
7. Find simple science experiments to show why a balloon rises, a plane flies, etc. Find out something about the men who discovered these things.
8. Visit an airport and a weather station. Visit an aircraft school.
9. Make a scale drawing of an airport. Construct a model airport.
10. See the film "Air Power is Peace Power."
11. Plan journeys by air and compare them with journeys by other means of transportation, as to time, route, cost.

12. List and draw the different kinds of craft that have been used and are being used in the air. Correlate with the 6th grade science unit.
13. Find out about a weather station. Run a simple one in the school. Study and use weather maps. Study some of the things a pilot needs to know such as air currents, cloud formations, air-pressure, etc. Correlate with science units.
14. Find out about the principal air lines in the Americas. Study their routes, airports, and services.

#### BIBLIOGRAPHY.

Books on aviation suitable for sixth grade boys and girls obtained from local and state libraries.

- Allen, Car B. THE WONDER BOOK OF THE AIR. Chicago: Winston, 1936.
- Aviation Research Associates. HOW PLANES GET THERE. New York: Harper, 1944.
- Aviation Research Associates. PLANES IN ACTION. New York: Harper.
- Aviation Research Associates. TYPES OF PLANES.
- Booth, Harold H. BOOK OF MODERN AIRPLANES. New York: Garden City, 1940.
- Coffin, Rebecca J. AIRPLANES, THE WORK THEY DO AND HOW THEY DO IT. Milwaukee: E. M. Hale, 1938.
- Collins, Francis Arnold. BOYS' BOOK OF MODEL AIRPLANES. New York: Century.
- Floherly, John Joseph. 'BOARD THE AIRLINER. New York: Doubleday, 1934.
- Floherly, John Joseph. AVIATION FROM SHOP TO SKY. New York: Doubleday.
- Fraser, Chelsea Curtis. HEROES OF THE AIR. New York: Crowell, 1936.
- Grimm, Dorothy Ruth Hose. JUNIOR AVIATION SCIENCE. New York: Noble, 1942.
- Hamilton, Edwin Timothy. COMPLETE MODEL AIRCRAFT MANUAL. 1938.
- Harney, Laura B. THE SKYCRAFT BOOK. Philadelphia: D. C. Heath, 1932.
- Jones, Paul. AN ALPHABET BOOK OF AVIATION. Philadelphia: McRae Smith, 1928.
- Lent, Henry Bolles. AIR PATROL. New York: Macmillan, 1942.
- AVIATION CADET. Macmillan, 1941.
- BOMBARDIER.
- EIGHT HOURS TO SOLO.
- Lloyd, Trevor. SKY HIGHWAYS. Bancroft, 1945.
- Love. JUNIOR PLANES. Chicago: Whitman.
- Maizlish, Israel Leon. WONDERFUL WINGS. New York: Row, Peterson, 1941.
- Neville, Leslie E. AVIATION DICTIONARY FOR BOYS AND GIRLS. Whittlesley.
- Phillips, Mrs. Josephine E. ON THE AIRWAYS. New York: Row, Peterson.
- Pryor, William Clayton. THE AIRPLANE BOOK. New York: Harcourt, Brace.
- DIRIGIBLE BOOK. New York: Harcourt, Brace.
- Sorenson, Frank England. NOW WE FLY. Chicago: Winston, 1944.
- Washburn, Stanley, Jr. BAMBOO TO BOMBERS. Chicago: Whitman.
- MOTION PICTURE. WINGS TO IRELAND. 16 mm. 30 minutes. Sound. Color. Pan American Society.

**GRADE 4. OVERVIEW CHART.**

SUBJECT MATTER AREA: OUR COMMUNITY, OUR STATE, AND NEW ENGLAND.

AREA OF GROWTH: HUMAN RELATIONSHIPS AND SELF-REALIZATION.

MAJOR FIELDS	UNDERSTANDINGS.
HOW AND WHY PEOPLE SETTLE IN NEW PLACES.	The Plymouth Colony and the Massachusetts Bay Colony were founded by English people. When, why, and how did they come? What happened? How were other parts of Massachusetts and New England settled? How have these settlements influenced the growth of Massachusetts?
HOW PEOPLE PROVIDE FOR THEIR HOME AND FAMILY LIFE.	People always need to provide food, clothing, shelter, and family life. All the people in a family must contribute. The ways in which these things are provided change as times and conditions change.
HOW PEOPLE OBTAIN AN EDUCATION.	People need education in order to carry on a democratic government. In New England we have many public and private schools at all levels. We are proud of them, and give them a great deal of money. What kind of schools and colleges did the early New Englanders have?
HOW PEOPLE PROVIDE FOR THEIR HEALTH, PROTECTION, AND GENERAL WELFARE.	Our town, and the State of Massachusetts, provide many health, protection, and welfare services. (This study extends and organizes what was learned in Grade 3.) How did the early settlers co-operate for the common good?
HOW PEOPLE USE THEIR LEISURE TIME.	Our town and our state provide recreational and cultural opportunities for all. What were the recreations of early New England? Which ones were provided by the community?
HOW DIFFERENT RACIAL AND NATIONAL GROUPS BENEFIT BY EXCHANGE OF IDEAS AND CULTURES.	The early people in New England were the Indians. Since 1620 large numbers of people from more than 10 nations in Europe, Asia, and Africa, and small groups of other nationalities have settled in Massachusetts. Our present population is made up of all these people living together, working together, and voting together. We must get along well together if we are to have a good town and state. Every group can learn a great deal from every other group. Besides, we all enjoy the food, the music, the art, and the customs of all the groups.

AREA OF GROWTH: ECONOMIC EFFICIENCY.

HOW ENVIRONMENTAL INFLUENCES DETERMINE GROWTH AND DEVELOPMENT OF NATIONS.	Massachusetts and New England have sea coast, level land, and mountains. Rivers have furnished water power and limited transportation. The climate is favorable; the soil in different areas is suitable for certain crops. All these factors have set the stage for New England development, from the beginning until now.
---	---



11. Our own map of Massachusetts (or New England). This may be a series of maps showing various things.
12. New England weather.
13. Occupations and industries in New England, past and present.
14. Conservation in our town and in New England.
15. The towns and cities in New England.
16. What are our rivers, and what do they do for New England?
17. Our government.

#### **GRADE 4. SAMPLE UNIT: HOW THE PEOPLE IN OUR TOWN WORKED TOGETHER TO MAKE OUR COMMUNITY WHAT IT IS TODAY.**

##### THINGS TO UNDERSTAND.

1. People move to new places to find a better way of living. Perhaps many people from different parts of Europe, Asia, and Africa have come to live in our town. They had different interesting languages and customs before they came. All of them came here to find better ways of living. All help to make our community successful.
2. People always need food, clothing, shelter, a home, a family, education, rules and regulations, religion, etc.
3. People living in our community have become increasingly interdependent.
4. Everyone must do his share of work to the best of his ability for a group project to be successful.
5. Group co-operation has made our community successful.
6. Everyone living in our community should be an active participant in all town affairs, whether it be attending baseball or football games, fairs, parades, church, school, or Town Meetings.
7. Our state is made up of hundreds of communities like our own — some larger, some smaller, but basically the same. These communities grew in much the same way as ours did.
8. There have been in the past and there are at present great and good and wise people in our community.
9. Whenever people live together in a group there must be some plan or set of rules for getting along well with one another. This plan is the government of the group.
10. Whenever people live together they organize special agencies or various groups which work for the good of the whole community.
11. There are many ways of earning a living. All workers are important.
12. The environmental influences of a community affect the people's activities, their history, their uses of the resources, their prosperity.
13. Our plant and wild life enriches our living and plans must be made to conserve it in our rapidly expanding civilization.
14. It is usually possible to find out what one wants to know if one knows how and where to look for information.

##### THINGS TO TALK ABOUT.

1. Who were the first settlers? Why did they settle here?
2. How did they provide for their food, clothing, shelter, education, recreation, and cultural needs?

3. Did the early settlers have any difficulties with the Indians?
4. What was their home and family life like?
5. How did the early settlers travel, transport goods, and communicate with one another?
6. Are there any landmarks that remind us of the early development of our community?
7. How did the Town Meeting affect our government?
8. How was our town named? When was it incorporated as a Town? What does the Town seal look like? How is it used?
9. Have the people in our town ever had to fight to preserve their right to freedom and the democratic way of life?
10. Were there any Minute Men from our town?
11. How did our school get its name?
12. What do our fathers do to make a living?
13. What are the important industries? How did they grow and develop? What were the early industries? Why did some survive and others fail? How did they influence the development of our town?
14. What industries have come here since early times? Are they still active? How have they influenced our town?
15. Did the railroad influence the development of our town? How do we travel from our town?
16. What is the area of our town? What towns form its boundaries?
17. What is the land like? Where are the high and low sections? The water ways? Does the land or water affect the way people in our town make a living? The way they enjoy themselves?
18. What is the soil like? Is there sand, gravel, clay, peat, etc.?
19. What is the climate like? Does it influence the things we do? Does it influence the way our fathers make a living?
20. What are the natural resources? What plant life and wild life do we find? How can we conserve them?
21. How have the people in our town become increasingly interdependent?
22. How do we have a good time in our town? How have people had a good time in the past?
23. How does our town provide for our health and safety? How does it protect our homes and property? Has it always done so?
24. How have the people in our town, past and present, contributed to our way of living?
25. What is our responsibility toward helping to make our town a good place in which to live?
26. What are the plans for the future development and improvement of our town?

#### THINGS TO DO.

1. Take an excursion around the community.
2. Interview older residents.
3. Invite source people to classroom.
4. Visit library and obtain books, pamphlets, old newspapers, etc.

5. Contact Historical Society.
6. Send questionnaire to local industries requesting information on their growth and development, raw materials used, how and where obtained, finished products, where sent, who works in industry, influence of industry upon local community. (This activity should not be overdone, and should be carefully planned and prepared for.)
7. Show on a map where local industries obtain raw materials and where finished products are sent.
8. Make dioramas showing historical events.
9. Compose and present dramatic play of home and family life, school life, recreation.
10. Write and present a pageant of important events in development of town.
11. Make a frieze showing development of community.
12. Plan a radio program similar to "You Are There".
13. Make a vocabulary chart.
14. Account for the names of streets, parks, and buildings.
15. Interview famous men and women and invite them to talk to class.
16. Make graphs, charts, slides, "movies", showing climate, rainfall, length of seasons, etc.
17. Exhibit relics from early days.
18. Collect leaves of various trees growing in community. Draw pictures of wild flowers, birds, insects, fish, etc.
19. Make and dress dolls representing various national groups in community. Show samples of things each has contributed to one another's way of living.
20. Collect samples of soil, sand, gravel, clay, peat, etc.
21. Make a time line of own life, parents' life, grandparents' lives, growth of town.
22. Exchange information about own community with children in another town.
23. Make relief maps, salt and water, plasticine, papier mache, etc.
24. Sing songs about colonial life.
25. Play the games colonial boys and girls enjoyed.
26. Learn folk dances of the period.
27. Read books, pamphlets, newspapers, magazines, encyclopedias, poems, etc., to find out needed information.
28. See motion picture on "Colonial Children".
29. See film strip on "Community Life".

#### SOURCES OF INFORMATION.

Local library; town reports; local histories; local literature; commemorative documents; Historical Society; older residents.



**GRADE 4. SAMPLE UNIT: THE DEVELOPMENT OF MASSACHUSETTS  
HOW PEOPLE SEEKING A NEW WAY OF LIVING ESTABLISHED A NEW TYPE COMMUNITY. HOW MASSACHUSETTS HAS DEVELOPED INTO A GREAT MANUFACTURING CENTER.**

**Note:** See also the material in the Grade Four Unit "Our Town", which should either precede this unit, or be combined with it.

UNDERSTANDINGS.

1. People came to this area looking for religious freedom and new business enterprises.
2. Home and family life is quite different today from that of the early settlers.
3. The pattern for the present free public school in the United States was formulated in Massachusetts.
4. The free public library, radio, television, press, motion picture contribute to keeping people well informed.
5. It is necessary that people be well informed if they are to participate intelligently in a democratic government.
6. Just as our local community organizes agencies to protect our health and general welfare, so does the state government.
7. Unbelievable things can be accomplished through group cooperation and pooling of resources.
8. Our way of living has been greatly enriched by the number of people with different cultural backgrounds who settled here.
9. There have been and are many famous men and women living in Massachusetts.
10. The climate, topography, location, natural resources of our state made it possible for the people to develop the area into a great industrial center.
11. There are many ways of earning a living. All workers are important and interdependent regardless of the type of work that they do.
12. The environmental influences in our state affect the things that people do and determine their prosperity.
13. The invention of the loom and power driven machinery influenced the development of manufacturing in Massachusetts, and changed the way the people lived.
14. Communities should have a variety of industries if they are to prosper over long periods of time.
15. Our state government has set apart reservations and parks to protect and conserve the natural plant and animal life. It has set up laws governing hunting and fishing.
16. Massachusetts is made up of hundreds of communities like our own, some larger, some smaller, but basically the same. These communities grew and developed much the same way as ours did.
17. In order that all the people living in all the cities and towns in our state may live together well, there is state government.
18. People living in Massachusetts have had to struggle to maintain their freedom, and democratic way of life.
19. The Mayflower Compact was a significant document because it was the first time a group of people organized self government.
20. The early Massachusetts Bay Colonists influenced the type of government that is used in all communities throughout the United States today.

21. The Town Meeting developed through its appropriateness to the needs of people who lived close together and farmed small areas of land.
22. People living in our state have certain rights and privileges.
23. Everyone should assume responsibility for making Massachusetts a good place in which to live.
24. A map can give us a great deal of information, if we learn how to use it.

PROBLEMS TO TALK ABOUT. (See also preceding unit.)

1. Why do tourists come to Massachusetts? Why do they visit Cape Cod, Boston, Cape Ann, Concord and Lexington, the Berkshire Hills?
2. What is the area of our state? What other states form its boundaries?
3. What is the land like? Where are the high sections? Where are the low sections? Where are the important waterways? What influence did the rivers have upon the industrial growth of cities in our state? Does the topography of the land affect the things that people do? Why was Cape Cod Canal built?
4. What is the soil like? What is meant by the Ice Age and the glacier? What is bedrock? Why are there so many lakes in Massachusetts?
5. What is the climate like? Does it influence the things that we do?
6. How have people earned a living in Massachusetts? Is this changing? Why?
7. What are the important industries in our state? How did they grow and develop? What were some of the early industries? Why did some survive and others fail?
8. How did the industries influence the development of our state?
9. What are some of the important products? What do we export to other countries and states? What do we import?
10. Why is our state called the harbor of the past and the port of the future?
11. Did the railroad influence the development of our industries? Of the recreational facilities? Of communication? Of homes and family life?
12. What other means of transportation do we find in our state? What has been its influence upon the growth and development? What will be the future development?
13. How do natural resources improve peoples' way of living?
14. What plant life and wild life do we find in our state today? What did the early settlers find? How can we conserve it? What is our state flower? Why did Chief Massasoit fear his people would starve to death?
15. What are the important cities in our state? How did they grow and develop?
16. Why do we find so many small communities throughout our state that are close together?
17. What landmarks in our state remind us of our early history?
18. Why was the Mayflower Compact a significant document?
19. How was the Massachusetts Bay Colony established?
20. Why was the General Court organized? How were representatives chosen? Who elected the governor? Who is the senator and the representative from your county? How is the governor elected today?
21. How did the Town Meeting affect the state government?
22. How was our state named? When did it become a state?

23. Have the people in Massachusetts ever had to fight to preserve their right to freedom and the democratic way of life? Who were the Minute Men? Why did Paul Revere make his famous ride? Why do we observe Patriot's Day?
24. What was the Boston Massacre? The Boston Tea Party?
25. Why is the ship Constitution famous?
26. What happened at Bunker Hill, Lexington and Concord?
27. What are the plans for the future development?
28. How can we help to make our state a good place in which to live and work?

#### ACTIVITIES.

1. Construct relief map of Massachusetts. Show harbors, plains, hilly sections, rivers, lakes, cities.
2. Make a frieze comparing life in early days with life today.
3. Plan a play about the "First Thanksgiving Day."
4. Exhibit utensils used by early settlers. Collect pictures showing how they dressed and the type of homes they had. Dress dolls representing various early occupations. Learn songs, dances, games of early days.
5. Make dioramas showing important historical events.
6. Write Chambers of Commerce of important manufacturing centers, fishing centers. asking for information and samples. ((Do not over-use this activity.)
7. Visit early colonial home, historical sites; or Boston, State House, and Logan Airport. if such a trip is convenient.
8. Plan a museum of early and modern objects of interest.
9. Read about Indian difficulties and contributions.
10. Collect books, pamphlets, magazines, articles. Obtain books and pictures from local and state libraries. Collect advertisements from newspapers and magazines of products made in Massachusetts. Collect pictures of various places in Massachusetts.
11. Dramatize the development of education.
12. Keep a record of the weather reports.
13. Make a "movie" showing the different watercraft used on Massachusetts waterways.
14. Prepare reports on how granite is quarried, how water power is used, how shoes, cloth, jewelry, etc., are manufactured.
15. Make an album of famous men and women.
16. Plan a vacation trip to Cape Cod, Cape Ann, Berkshires, for visitor from west.
17. Exchange letters with children living in other cities and towns.
18. Learn about various welfare and service agencies, Red Feather, Massachusetts Safety Council, etc.
19. Locate on map state forest reservations, bird sanctuaries.
20. List trees and wildflowers that grow in state.
21. Invite older people to tell about how Massachusetts life has changed since they were boys and girls.
22. Use map of Massachusetts constantly, learn everything possible from it.

#### GRADE 4. SAMPLE UNIT: OUR NEW ENGLAND THEN AND NOW.

It is the purpose of this unit to study the life and times of Colonial New England, as well as New England of the present day, thereby gaining an understanding of how New England came to be, the whys and wherefores which brought about its settlement, and the factors in its development down through the years into an important manufacturing, recreational, industrial and agricultural section of the present day. Through the study of this unit the children will develop an increased understanding of and appreciation of their home, New England, Then and Now.

##### I. THINGS TO UNDERSTAND.

1. The colonists left Europe and came to America because they wanted religious freedom, thereby laying the foundation for our mode of living, an important factor of which is religious freedom.
2. In early New England we find the beginnings of democratic government, religious freedom, and public education, essential to a democracy.
3. During the Ice Age, a great glacier spreading over the land made our New England countryside with her lakes, valleys, mountains, rivers, and harbors, her natural advantages.
4. New England's natural resources determine the industry in which many people are engaged.
5. New England's hilly, rocky land was not conducive to major farming, therefore people turned to manufacturing because of New England's abundant water power.
6. Fishing became an important industry in New England because of its location near the fishing banks and its good natural harbor facilities.
7. New England's natural advantages, variable climate and picturesque scenery and background make furnishing recreation a major industry.
8. Our colonial forefathers contributed in a large degree to our present way of living.
9. Occupations depend on geographic factors such as climate and location.
10. As civilization progresses, the standards of living are raised, and people become interdependent.
11. It is necessary to have a knowledge of the past in order to understand our present way of living.
12. There were many communities developing at the same time our own community was being settled.

##### II. APPRECIATIONS TO BE DEVELOPED.

1. A feeling of gratitude and respect for all types of workers.
2. Wonder and awe at the things people can do by working together.
3. A desire to participate and share in group activities.
4. An appreciation of the beauty and splendor of the natural beauty in New England.
5. Respect for the ways all people worship.
6. Appreciation of bravery and daring of early settlers.
7. Appreciation of comfort of home and family life.
8. Keener awareness of things that happen around one and why.
9. Appreciation of interdependence of people.
10. Appreciation of music, literature, art, drama, that is characteristic of New England.

### III. SKILLS TO BE DEVELOPED.

1. Interpreting and explaining maps intelligently.
2. Using maps to locate places discussed.
3. Using the library and materials found there to secure information.
4. Recognizing need for using many sources for a well rounded viewpoint on a given subject.
5. Using encyclopedias and other reference materials efficiently.
6. Using Table of Contents and Index intelligently.
7. Expressing self clearly, in written or oral work.
8. Collecting and organizing material independently.
9. Mastering use of tools for handicrafts.
10. Persuading other people to participate.

### IV. PRESENTATION.

1. A study of maps might precede the study of the unit on New England. How to use maps, where the New England States are located, where their own community is located.
2. Stories might be read aloud to the children followed by discussion, of how our life differs from life in those early days. This discussion would lead into other questions which would promote interest in wanting to study the subject further.
3. Pictures relating to Colonial times could be exhibited in the room.
4. An exhibit on Colonial Life might be displayed in the room. Questions would be asked and could be noted. Children would determine best method for finding answers to questions.
5. Books about Colonial Days and books about New England could be placed on the library table or other convenient places.
6. As the children ask questions, each one could be recorded on large paper. As the list of questions grows, children could list things that they could do that would help them to obtain greater understanding of the main problems.

### V. THINGS TO TALK ABOUT.

1. Who were the first settlers? Why did they come here? Where did they settle? When?
2. What was their home and family life like? Compared with ours today?
3. How did they provide for their food, clothing, shelter?
4. How did the early settlers travel, transport goods, and communicate with one another?
5. How did they provide for their education, recreation, and cultural needs?
6. What were some of the difficulties encountered in settling this area?
7. What are the historic shrines that remind us of their struggle for independence?
8. What type of government did they set up? How has it influenced government in New England today?
9. Who were the Minute Men? Who were the Green Mountain Boys?
10. Who have been the famous men and women from New England? What were their contributions to our way of living?
11. How do fathers in New England make a living today? How did the early settlers make a living?

12. Why is New England known as a great manufacturing region?
13. Why did New England become the second most important fishing area in the United States?
14. How did the Ice Age affect the topography of New England area?
15. How does the climate, topography, rivers, harbors, valleys and mountains affect the prosperity of this region?
16. How are rivers used as a source of power?
17. Why is New Hampshire called the "Granite State"? Maine the "Pine Tree State"? Vermont the "Green Mountain State"?
18. What are some of the important natural resources of the New England states?
19. How can the wildlife and animal life of the area be preserved?
20. What are the important recreational activities? Where are the important recreation centers?
21. How is New England interdependent with all parts of the United States?
22. What has been the contribution of many kinds of peoples to our way of living?
23. How does the New England area attract visitors from all over the world?

## VI. THINGS TO DO.

1. Start a card catalogue of various books that give information concerning New England.
2. Tell the class about different sections of New England that you have visited.
3. Make posters, advertising the summer and winter attractions of New England
4. Plan a vacation trip in your state or New England.
5. Start a list of products manufactured in New England. Make a poster illustrating each product you add to the list.
6. Visit a manufacturing plant in own city or nearby city.
7. Collect articles about Colonial days and exhibit in room.
8. Visit the Children's Museum in Jamaica Plain to see the exhibit on Colonial Life. Visit the Wayside Inn in Sudbury.
9. Make a mural of the first New England town and one of a modern New England town.
10. Make a class booklet entitled **Famous New England Men and Women**. Collect pictures, stories, clippings and articles about them. Start a new page for each person. Make an index and table of contents for the book.
11. Have an exhibit, and display of all materials collected, made, or written about by the various members of the class. Invite the entire school to visit it.
12. Sketch a map of New England showing the important rivers, mountains, lakes, and harbors.
13. Make a larger relief map (papier mache) of the New England region.
14. Collect labels, pictures and advertisements of all the products manufactured in New England, shoes, leather goods, paper, woolens, cotton, jewelry, machinery, and paste these labels on a big outline map of New England to show where they are made.
15. Construct a model of an early settlement.
16. Divide the class into groups. Let each group take one New England state. Collect pictures and other information about your group's state and make an interesting travel book.

17. Write a play about some phase of Colonial Life. **A Day in a Colonial Home, A Day at School with a Pilgrim Boy or Girl.** Invite another fourth grade class in town to see it.
18. Act out stories you have read about Colonial Life in New England.
19. Arrange an assembly program in which each child dresses as some famous New England person and tells the story of the person he represents.
20. Prepare a report on a special topic about New England farming, manufacturing, transportation, communication, quarrying, fishing, etc.
21. Read as many interesting books about New England as you can. Write book reports on each book read and report to class.
22. Use camera to take pictures of famous landmarks.
23. Write original poems, riddles, stories.
24. Pretend you are a boy or girl of the Plymouth colony and write a story telling about your trip over on the Mayflower.
25. Imagine you are one of the early settlers of New England and plan a short talk describing the new country to relatives left in England.
26. Learn songs about New England. Write original songs.
27. Write to Chambers of Commerce of the various New England States for information booklets, and pictures.

## VII. OVERVIEW OF SUBJECT MATTER.

(This outline is included in this unit because of the limited material available on New England in many classrooms.)

### A. Settlement.

1. Founding of Rhode Island
2. Founding of Connecticut
3. Founding of Maine
4. Founding of New Hampshire
5. Founding of Vermont

### B. Home and Family Life, Then and Now.

1. Homes and furnishings
2. Provision for food, clothing, warmth
3. Self-sufficiency compared with interdependence
4. Influence of the Church
5. Superstitions, beliefs, and medical knowledge
6. Protection of general welfare
7. Education
8. Recreation
9. Art, literature, music, cultural contributions

### C. Environmental Influences.

1. Topography, rivers, lakes, harbors, ocean, mountains, hills, valleys, soil, rock formations, glacier effects
2. Climate— weather, seasons, growing season
3. Location on earth

4. Extent to which environment can be controlled
5. Natural resources

**D. Effect of Environmental Influences Upon Living, Then and Now**

1. Growth of community and region
2. Industry and occupation
3. Farming and dairying
4. Use of natural resources
5. Products
6. Transportation and Communication
7. Interdependence

**E. Government and History, Then and Now.**

1. Struggle with Indians, British, French
2. Town meetings, voting, taxation, representation
3. Rules, regulations, laws
4. Influence of the Church
5. Famous landmarks
6. Famous men and women
7. Local and state government today

VIII. EVALUATION.

**1. Observation of changes occurring in children's behavior.** Teacher makes notes concerning incidents that give evidence for need of growth or evidence that growth has apparently taken place.

**2. Samples of different types of tests.**

Matching Type.

- |  |               |
|--|---------------|
| 1. Most important activities of colonists. | Rhode Island  |
| 2. Oldest university in United States.     | Manufacturing |
| 3. Smallest state in New England.          | Harvard       |

Multiple Choice.

Check the correct answer:

1. In 1620 the Pilgrims landed at
  - a. Plymouth.
  - b. Boston.
  - c. Rhode Island.
  - d. New Bedford.
2. They left England because
  - a. they wanted religious freedom.
  - b. the king made them pay taxes.
  - c. the king drove them out.
  - d. they had no homes.

True or False.

Write True after the sentence if it is true.

Write False after the sentence if it is false.

1. Manufacturing is the most important industry in New England.



2. Gloucester is an important fishing port.
3. There are four states in the new England group of states.

#### Omissions.

Fill in the blanks with the correct word.

1. The Pilgrims came from \_\_\_\_\_.
2. The coast line of New England is \_\_\_\_\_.

### GRADE 4.

#### SAMPLE UNIT: HOW PEOPLE EARN A LIVING BY MANUFACTURING GOODS

##### THINGS TO UNDERSTAND.

1. The rocky soil of the New England region was not good for farming so the people living in this area sought other ways of earning a living.
2. The abundant water supply, good harbors, excellent riverways, favorable location for trade with people living in the interior of our country and overseas contributed toward making New England a great manufacturing area.
3. The invention of easier ways of doing things promoted rapid development of factories.
4. The demand for greater number of workers inside the factories influenced people from all over the world to settle in New England.

##### THINGS TO TALK ABOUT.

1. How did people make the things that they needed before factories were built?
2. Who is known as the "Father of Manufacturing"?
3. How did the invention of the cotton gin by Eli Whitney influence New England manufacturing?
4. What were the favorable and unfavorable environmental influences that helped to make manufacture a most important means of earning a living?
5. What is the meaning of the word "textile"?
6. How is cotton manufactured into goods? What are some of the by-products?
7. How is rayon used to make goods? Fiberglass? Nylon? Wool? Metal? Rubber?
8. What electrical goods are manufactured in New England?
9. Where and how are shoes made?
10. Where and how is paper made?
11. Why did people from all over the world settle in New England?

##### THINGS TO DO.

1. Study the map of New England.
2. Make a relief map of New England showing harbors, riverways, dams, waterpower plants.
3. Locate important factories and show products made.
4. Show sources of raw materials and market for finished goods.
5. Show how goods are transported to markets.
6. Construct dioramas showing early industries.
7. Write business letters to Chambers of Commerce.

8. Read about New England and its manufacturing.
9. Collect samples of goods made in New England.
10. Visit a nearby factory.
11. List native countries of parents and grandparents.

#### **GRADE 4.**

#### **SAMPLE UNIT: HOW PEOPLE TRAVEL AND TRANSPORT GOODS FROM ONE COMMUNITY TO ANOTHER.**

##### THINGS TO UNDERSTAND.

1. Transportation is the business of carrying goods and persons from one place to another.
2. Trains, boats, buses, and planes carry goods and people in and out of New England.
3. New England communities have modern transportation facilities.
4. Our community depends upon trade and transportation to bring us food and all other necessities for our comfort and happiness.
5. Many communities in New England are interdependent.
6. Transportation makes it possible to send the products made in one community to another so that people who need them may buy them.
7. Transportation has played an important part in the growth and development of the New England area.
8. Transportation facilities are constantly being improved.
9. Our city, state, and federal government further the development of transportation by appropriating money for highways, bridges, docks, airports, etc., and by enacting and enforcing safety regulations.
10. The climate, and beauty, the recreational activities, the historic background of New England attract tourists and vacationers from all parts of the country during the entire year.

##### THINGS TO TALK ABOUT.

1. How does transportation contribute to the interdependence of communities?
2. How has transportation contributed toward making the New England area a great industrial region?
3. Why are transportation facilities constantly improved?
4. How is transportation supported?
5. Why are safety regulations and laws set up and enforced?
6. How does transportation help to attract tourists and vacationers to this area?

##### THINGS TO DO.

1. Show colored slides showing various means of transportation, then and now.
2. Form committees to study various types of transportation.
3. Gather road maps, pictures, schedules, time tables, toy trucks, airplanes, etc.
4. Discuss safety precautions necessary in cities, highways, intersections, airways, railroads, waterways.
5. Trace routes by which goods are exported and imported.

6. Make a map showing route numbers, city limits, state boundaries, scale of miles, color key for highways, railways, airways, etc.
7. Visit bus station, trucking firm, railroad yards, airport, docks, etc.

#### GRADE 4.

#### AUDIO-VISUAL AIDS.

The following films and transcriptions listed as aids in the Social Studies curriculum are available from the Office of Radio-Audio-Visual Aids in the State Department of Education Bldg. at 200 Newbury Street, Boston 16, Mass. All transcriptions are on 16 inch discs, requiring a dual speed playback machine (78 r.p.m. and 33 1/3 r.p.m.) for playing. Record albums are on regular (78 r.p.m.) discs. All films are 16 mm. width and sound.

#### FILMS.

- G 2 New England Fishermen, 10 min., black & white
- L 3 Know Your Library, 10 min., black & white
- N 16 The Wood Thrush, 10 min., color
- N 18 Realm of the Wild, 28 min., color
- N 21 Flower Growth, 10 min., color
- Sa 3 The Safest Way, 15 min., black & white
- Sc 22 Our Common Fuels, 10 min., black & white
- So 4 Animals in Modern Life, 10 min., black & white
- Sc 17 How We Get Our Power, 10 min., black & white
- So 8 Making Cotton Clothing, 10 min., black & white
- So 11 Wool, From Sheep to Clothing, 10 min., black & white
- So 12 Autumn on the Farm, 10 min., color
- So 32 Making Shoes, 10 min., black & white
- So 34 The Airport, 10 min., black & white

#### TRANSCRIPTIONS.

OUR NATION'S SHRINES SERIES (15 minute programs)

Faneuil Hall, Bunker Hill, St. Paul's Church

ADVENTURES IN RESEARCH SERIES (15 minute programs)

Various programs on discoveries and inventions in the fields of medicine, transportation, etc. too numerous to mention; list available from Office of Radio-Audio-Visual Aids.

SEEING AMERICA SERIES (15 minute programs)

Fishermen of Gloucester

DOWN TO EARTH SERIES (15 minute programs)

All programs on gardening in the community.

In addition to the films and transcriptions listed, teachers will find great help in choosing audio-visual aids for use in the social studies in the following sources:

1. EDUCATIONAL FILM GUIDE, H. W. Wilson Co., New York. An annual listing of films with monthly supplements. This guide lists films alphabetically by title and subject and includes, in many cases, a review of the film by scholastic magazines. Local distributors for the films are also given.
2. FILMSTRIP GUIDE, H. W. Wilson, New York. An annual listing of filmstrips with monthly supplements of the same type as described above.
3. EDUCATOR'S GUIDE TO FREE FILMS, Educators Progress Service, Randolph, Wisconsin.

sin. An annual listing of all sponsored films which are available for rental for the cost of postage only. Although they contain some advertising of the Sponsor's product, they are excellent films.

4. LIST OF EDUCATIONAL RECORDINGS FOR MORE EFFECTIVE LEARNING, Educational Service, 1702 K Street, N. W., Washington 6, D. C. An annual listing of recordings which may be purchased by educators. Prices are given.
5. UNITED STATES OFFICE OF EDUCATION, Radio Section, Washington 25, D. C. Information on Transcriptions available and general help in any question concerning radio programs, scripts, recordings, and transcriptions.

**BIBLIOGRAPHY.** (This bibliography is suggestive of the type of materials available from local and state libraries. It contains material on Massachusetts and New England.)

#### **Children's Bibliography for Massachusetts.**

- Earle, Alice Morse. CHILD LIFE IN COLONIAL DAYS. Macmillan.
- Earle, Alice Morse. CUSTOMS AND FASHIONS IN OLD NEW ENGLAND.
- Faris, J. T. WHERE OUR HISTORY WAS MADE. Silver Burdett.
- Forbes, Esther. AMERICA'S PAUL REVERE. Houghton Mifflin.
- Forbes, Esther. JOHNNY TREMAIN. Houghton Mifflin.
- Hawthorne, Nathaniel. TRUE STORIES FROM HISTORY AND BIOGRAPHY. Houghton Mifflin. Delightfully written accounts of unusual episodes.
- Howe, M. H. DeWolfe. BOSTON, THE PLACE AND THE PEOPLE. Macmillan. Excellent material on foundation and early years in Boston.
- MacElroy, M. H. WORK AND PLAY IN COLONIAL DAYS. Macmillan. Gives a good idea of home life and customs.
- Mahoney, John J. READERS OF THE GOOD OLD DAYS. Education Review. Educational Publishing Company. A clear and interesting story of the early school readers.
- McClosky, Robert. PICTURE BOOK OF BOSTON AND THE PUBLIC GARDENS. Viking.
- Perkins, L. F. PURITAN TWINS. Houghton Mifflin Co.
- Thwing, Annie. CROOKED AND NARROW STREETS OF THE TOWN OF BOSTON. Lauriat Book Co.
- Monsell, H. A. JOHN MARSHALL, BOY OF YOUNG AMERICA. Bobbs-Merrill.
- Meadowcraft, Enid. FIRST YEAR: A STORY OF THE PILGRIMS IN AMERICA.
- Barksdale, Lena. FIRST THANKSGIVING. Knopf.
- Dagleish, Alice. AMERICA BUILDS HOMES: THE STORY OF THE FIRST COLONIES. Scribner's.
- Goslin, Ryllic C. and Omar P. DEMOCRACY. Harcourt, Brace.
- Leaf, Munro. FAIR PLAY. Lippincott.

#### **Teacher's Bibliography for Massachusetts.**

- Booklets may be obtained from the following:
- Massachusetts Development and Industrial Commission, 20 Somerset Street, Boston 8.
- Western Massachusetts Electric Company, Springfield, Mass. THE INDUSTRIAL CLIMATE OF WESTERN MASSACHUSETTS.
- Department of Education. MASSACHUSETTS BAY COLONY TRICENTENARY.
- Beebe, Lucius M. THE CHARLES. Rinehart.
- Botkins, B. A. A TREASURY OF NEW ENGLAND FOLKLORE. Crown Publishers.

Chamberlain, Samuel. EVER NEW ENGLAND. NEW ENGLAND. HISTORIC SALEM. HISTORIC BOSTON. CAPE COD IN THE SUN. GLOUCESTER AND CAPE ANN. MARTHA'S VINEYARD. OLD MARBLEHEAD. BOSTON LAND MARKS. LONG-FELLOW'S WAYSIDE INN. LEXINGTON AND CONCORD. Chanticleer Press.

Children's Catalog.

Curtis, Alice Turner. A LITTLE MAID OF MASSACHUSETTS COLONY.  
A LITTLE MAID OF BUNKER HILL.

Philadelphia: Penn. Publishing Co.

Dawes, S. E. COLONIAL MASSACHUSETTS. Boston: Silver Burdett.

Dix, Beulah Marie. SOLDIER RIGDALE: How He sailed in the Mayflower and served Myles Standish.) Boston: Macmillan Co.

Early, Eleanor. AND THIS IS BOSTON! Houghton Mifflin Co.

Federal Writer's Project. MASSACHUSETTS: A GUIDE. Houghton Mifflin Co.

Flagg, Mildred Buchanan. A BOY OF SALEM. PLYMOUTH MAID. New York: Thomas Nelson and Sons.

Hard, Walter R. THE CONNECTICUT. Rinehart.

Humphreys, Grace. THE STORY OF THE MARYS. (Story of a Plymouth Girl.) Philadelphia: Penn. Publishing Co.

Kaler, James Otis. MARY OF PLYMOUTH: A STORY OF PILGRIM SETTLEMENT. Boston: American Book Co.

Lenski, Louis. PURITAN ADVENTURES. New York: Lippincott Co.

Lyons, A. C. INVITATION TO BOSTON.

MASSACHUSETTS: A GUIDE TO ITS PLACES AND PEOPLE. Boston: Houghton Mifflin.

Meadowcroft, Mrs. Enid LaMonte. THE FIRST YEAR: A STORY OF THE PILGRIMS IN AMERICA. New York: Crowell.

Otis, James. RUTH OF BOSTON. Boston: American Book Co.

Smith, Chard P. THE HOUSATONIC: PURITAN RIVER. Rinehart.

Snow, Edward R. A PILGRIM RETURNS TO CAPE COD.

Usher, Roland G. THE STORY OF THE PILGRIMS FOR CHILDREN. New York: Macmillan Co.

Watson. BOSTON TEA PARTY. Boston: Lee and Shepard. (Very old edition, but good information on child's level.)

Young, Stanley. MAYFLOWER BOY. New York: Farrar.

### **Children's Bibliography for New England.**

Bailey, Caroline Sherwin. GIRLS AND BOYS OF COLONIAL DAYS. New York: Grosset and Dunlap, 1917.

Brown, George Waldo. REAL LEGENDS OF NEW ENGLAND. New York: Whitman, 1930.

Burton, Alma Holman. THE STORY OF THE INDIANS OF NEW ENGLAND. Boston: Silver Burdett.

Coatsworth, Elizabeth J. AWAY GOES SALLY. LITTLEST HOUSE. New York: Macmillan Co., 1934.

Curtis, Alice Turner. A LITTLE MAID OF NARRAGANSETT BAY.  
A LITTLE MAID OF TICONDEROGA.

A LITTLE MAID OF OLD CONNECTICUT. Philadelphia: Penn Publishing Co., 1922-27.

- Duffe, Marcelle Laval. NEW ENGLAND COLONIAL DAYS. Evanston, Ill.: Row Peterson Co., 1941.
- Emmett, Elizabeth. THE LAND HE LOVED, A STORY OF OLD NARRAGANSETT. New York: Macmillan Co.
- Enright, Elizabeth. THE SEA IS ALL AROUND. New York: Farrar, 1940. A story which takes place on an island off the coast of Maine.
- Finch, Grant E. NEW ENGLAND GEOGRAPHY. New York: Rand McNally, 1933.
- Field, Rachel. CALICO BUSH. New York: Macmillan Co. A New England story set in the Maine country.
- French, George. NEW ENGLAND: WHAT IT IS AND WHAT IT IS TO BE. Boston: Chamber of Commerce.
- Hader, Berta and Elmer. TOMMY THATCHER GOES TO SEA. New York: Macmillan Co., 1937.
- Hauman, George and Doris. HAPPY HARBOR. New York: Macmillan Co.
- Hawthorne, Nathaniel. GRANDFATHER'S CHAIR. Boston: Houghton Mifflin.
- Humphrey, Mrs. Frances A. HOW NEW ENGLAND WAS MADE. New York: Lothrop.
- Larcom, Lucy. A NEW ENGLAND GIRLHOOD. Boston: Houghton Mifflin.
- Lawrence, Robert Means. NEW ENGLAND COLONIAL LIFE. Cosmos, 1927.
- McClintock, Marshall. THE STORY OF NEW ENGLAND. New York: Harper, 1941.
- Meigs, Cornelia. MASTER SIMON'S GARDEN. THE COVERED BRIDGE. New York: Macmillan Co. A story of children in Vermont in the early 1800's.
- NEW ENGLAND PRIMER, THE. A Twentieth Century Reprint. Boston: Ginn & Co.
- Philbrook, Elizabeth. FAR FROM MARLBOROUGH STREET. New York: Viking Press, 1944. A little girl's journey by stage from Boston to Connecticut.
- Pumphrey, Margaret B. PILGRIM STORIES. New York: Rand McNally, 1932.
- NEW ENGLAND COLONIAL DAYS. Pamphlet. Evanston, Ill.: Row, Peterson Co.
- Rose, Grace Norton. PORTS OF THE PAST. New York: Harcourt Brace, 1941. Tales of old New England sea ports.
- Sickels, Evelyn Ray. THE SCHOOL BELL RINGS. New York: Scribner, 1942.
- STORY OF NEW ENGLAND. Supplement to the Stull-Hatch Geographies. Boston: Allyn and Bacon, 1938.
- Wilson, Mrs. Eleanor Hubbard. PIXIE ON THE POST ROAD. New York: E. P. Dutton Co., 1939. A mystery of the old Boston Post Road in colonial days.

### Teachers' Bibliography for New England.

- Adams, James Truslow. THE FOUNDING OF NEW ENGLAND. Boston: Atlantic Monthly Press, 1922.
- Adams, James Truslow. REVOLUTIONARY NEW ENGLAND, 1769 - 1776. Boston: Atlantic Monthly Press, 1924.
- Adams, James Truslow. NEW ENGLAND IN THE REPUBLIC, 1776 - 1850. Boston: Little Brown & Co., 1926.
- Note: These three books on history of New England probably are best single sources for teachers on the history of the region.
- Akerman, Edward A. LOCATIONAL FACTORS IN THE NEW ENGLAND FISHING INDUSTRY. Unpublished doctoral dissertation, Department of Geography and Geology, Harvard University, 1939. Excellent study of fishing industry of New England. Well illustrated. Discusses physical factors which affect the industry.

- NEW ENGLAND PROSPECT. New York: American Geographical Society, 1933. Survey by scholars of the resources, industries, and future of the New England region. Perhaps best single volume that has been written on the geography of New England.
- Blough, McClure, Colvin, Wilson. FUNDAMENTALS OF CITIZENSHIP. Chicago: Laidlaw Brothers, 1940. Junior High text containing a 94-page supplement on New England. Summary of history and geography of region.
- Clark, V. S. HISTORY OF MANUFACTURE IN THE UNITED STATES. New York: Macmillan Co., 1929. Tells much of early manufacturing in New England.
- Emerson, Philip. NEW ENGLAND SUPPLEMENT. New York: Macmillan Co., 1931. Jr. High. A regional geography of New England which supplements the Living Geography Series by Huntington. Well written and illustrated.
- Fiske, John. BEGINNINGS OF NEW ENGLAND. Boston: Houghton Mifflin, 1930.
- Hard, Walter and Margaret. THIS IS VERMONT. Brattleboro, Vt.: S. Daye Press, 1936. Pictures, narrative, and discussion of Vermont.
- Hart, SOURCE BOOK OF AMERICAN HISTORY. New York: Macmillan Co., 1925.
- Howe, Henry Forbush. PROLOGUE TO NEW ENGLAND. New York: Farrar and Rinehart, 1943.
- McFall, Robert. EXTERNAL TRADE OF NEW ENGLAND. Washington, D. C.: United States Department of Commerce, 1928. A summary of foreign and domestic trade of New England.
- Mills, Lewis S. THE STORY OF CONNECTICUT. New York: Charles Scribner's Sons, 1935. Jr. High. Geography and history of the state of Connecticut. Good for research and reference.
- Nutting, Wallace. MAINE BEAUTIFUL. MASSACHUSETTS BEAUTIFUL. VERMONT BEAUTIFUL. CONNECTICUT BEAUTIFUL. New York, Garden City: Garden City Press. Illustrated narrative of travel and interesting places to see in these four states.
- Slocum, Harold W. THE STORY OF VERMONT. New York: Charles Scribner's Sons, 1926.
- Smith, J. Russell. MEN AND RESOURCES. New York: Harcourt Brace & Co., 1937. High School. Two good chapters on New England.

**Guides.** Each of the following guide books was written by writers of the Federal Writers' Project of the Works Progress Administration. Each book gives illustrations, discussions, and summaries concerning life in the state, travel, natural resources, and interesting historical bits.

CONNECTICUT: A GUIDE TO ITS ROADS, LORE, AND PEOPLE. Boston: Houghton Mifflin.

MAINE: A GUIDE DOWN EAST. Boston: Houghton Mifflin, 1937.

NEW HAMPSHIRE: A GUIDE TO THE GRANITE STATE. Boston: Houghton Mifflin, 1938.

RHODE ISLAND: A GUIDE TO THE SMALLEST STATE. Boston: Houghton Mifflin, 1937.

VERMONT: A GUIDE TO THE GREEN MOUNTAIN STATE. Boston: Houghton Mifflin, 1937.

**There are numerous magazine articles on New England.**

Adams, C. "New England's Wonderland of Mountain, Lake, and Seascape." National Geographic Magazine, September, 1931, pp. 311-318.

- Barker, H. F. "Founders of New England". *American Historical Review*, July, 1933, pp. 702-713.
- Botts, A. K. "New England Water Power, Facts and Traditions". *Journal of Geography*, October, 1935, pp. 278-285.
- Hanson, E. "Life in the New England Colonies". *American Childhood*, November, 1936, 22: 7-8.
- Irwin, W. "What You Can Learn from New England." *American Magazine*, April, 1930, pp. 27-30.

**Booklets are available from the following:—**

- New Hampshire State Planning and Development Commission, 50 Capitol St., Concord, New Hampshire.
- Rhode Island State Chamber of Commerce, Providence, R. I.
- Connecticut State Development Commission, State Office Building, Hartford, Connecticut.
- Maine Development Commission, State House, Augusta, Maine.
- Vermont State Development Commission, State House, Montpelier, Vermont.
- John Hancock Life Insurance Co., Boston, Mass. Biographies of important men in New England history.



**GRADE 5. OVERVIEW CHART.**

SUBJECT MATTER AREA: OURSELVES, OUR COMMUNITY, AND THE UNITED STATES.

AREA OF GROWTH: HUMAN RELATIONSHIPS AND SELF-REALIZATION.

MAJOR FIELDS	UNDERSTANDINGS.
HOW AND WHY PEOPLE SETTLE IN NEW PLACES.	Explorers: Norsemen, Spanish, Portuguese, French, English. Their reasons for coming, areas discovered, and results.
HOW PEOPLE PROVIDE FOR THEIR HOME AND FAMILY LIFE.	Permanent settlements in the New World. Home and family life in New Amsterdam, Middle Atlantic, and southern colonies.
HOW PEOPLE OBTAIN AN EDUCATION.	Development of free public education in the United States. Schools in New England. Education in the early South. Pioneer schools. Why were these people so eager to educate their children? What are some of the interesting and important things to know about education in the United States today? (These facts may be developed according to the ability and interest of the class.) Besides schools, what other facilities have we? (libraries, radio, lectures, movies, etc.)
HOW PEOPLE PROVIDE FOR THEIR HEALTH, PROTECTION, AND GENERAL WELFARE.	Health conditions in different areas and occupations. Story of the development and functioning of health and safety organizations. What control is exercised by the government? What is done by community organizations, and by private wealth?
HOW PEOPLE USE THEIR LEISURE TIME.	Growth of organized recreations, their purpose, value, and history. Which are publicly controlled? (For instance, organized sports, National parks, movies, various hobby associations, etc.) Take up as interest leads.
HOW DIFFERENT RACIAL AND NATIONAL GROUPS BENEFIT BY EXCHANGE OF IDEAS AND CULTURES.	Our American Heritage of many cultures. A study, as far as time and interest permit, of some of the national cultures that have mingled in America. All the arts and genius of the peoples from Europe, Asia, and Africa have made America what it is.

AREA OF GROWTH: ECONOMIC EFFICIENCY.

HOW ENVIRONMENTAL INFLUENCES DETERMINE GROWTH AND DEVELOPMENT OF NATIONS.	The United States has every kind of land and water formation, and almost every kind of weather. It has mountains, plains, deserts, forests, rivers and lakes great and small, harbors. Consequently its development has been almost unlimited. Show how men have taken advantage of these environmental features, and sometimes controlled and changed them.
---	--

MAJOR FIELDS	UNDERSTANDINGS.
HOW PEOPLE EARN A LIVING.	The development and present status of the industries of the United States; e.g., agriculture, merchandising, manufacturing, lumbering, fishing, mining, etc. The growth of our big and specialized industries, as contrasted with pioneer occupations and even with the industries of the last century. (For instance, the changes in agriculture brought about by machinery.) The role of transportation, and changes in transportation. Importance of air transportation.
HOW PEOPLE BECOME INCREASINGLY INTERDEPENDENT.	Interdependence of all parts of the United States upon all other parts. Commerce between the United States and the rest of the world. Modes of transportation. Responsibility of one nation for others.
HOW PEOPLE USE AND CONTROL THEIR NATURAL RESOURCES.	Listing of the major natural resources of the United States; study of their locations and importance to our national economy. What is being done, and what should be done, to conserve these resources? (Emphasis on soil, forest, minerals, animals, or any of current interest.) Correlate with "Industries".

AREA OF GROWTH: CIVIC RESPONSIBILITY.

HOW CITIES AND TOWNS GROW AND DEVELOP.	Origin and growth of our great cities; characteristics, location, and importance. Factors causing growing. Distribution of population, and different types of towns and other settlements.
HOW PEOPLE GOVERN THEMSELVES.	Democracy, our government: what it means. Development since pioneer days: (1) local self-government; (2) colonial government; (3) independence; (4) union under the constitution; (5) present procedures of national government. Famous statesmen. Declaration of Independence. Bill of Rights.

**GRADE 5. SUGGESTED UNITS.**

The following units are suggestive only. They include some short, specific topics; but many can be expended, if desired, to include several Major Fields.

1. Our early explorers (or any group taken separately). Our Map of Exploration.
2. Home life in the South, long ago, and now.
3. Our free public schools. America's way of educating its people. The story of Horace Mann, in New England and in Ohio.
4. How discoveries and science have affected our American way of living.
5. A collection of materials (folk songs, stories, poetry, pictures, costumes, handicrafts, etc.) showing the cultures of the peoples who make up the people of the United States.
6. A map collection, showing many things about the United States.
7. A study of any of the industries, with much related material from the Major Fields.
8. Conservation of natural resources.

9. The development of any city or area.
10. Our democratic institutions. Or, a study of any phase of government, and its development.

## **GRADE 5.**

### **SAMPLE UNIT: HOW THE UNITED STATES WAS SETTLED BY PIONEERS.**

#### POSSIBLE APPROACHES.

1. Read to the class from the book "Children of the Covered Wagon" by Mary Jane Carr, illustrated by Esther Brann.
2. Arrange a display of pictures and "things pioneer" around the room.
3. Display books about these historical days.
4. Show film strips and moving pictures on the adventurous people who settled and developed our U.S.A.
5. Suggest a television trip through the U.S.A., using puppets dressed in regional costumes to represent sections. Have Miss Liberty and Uncle Sam puppets act as guides.

#### THINGS TO UNDERSTAND.

1. The pioneers left their original settlements in order that they might have more land, better hunting, further opportunities for trade, and meet the needs of individual and group.
2. Environmental factors such as terrain, climate, natural resources, existing trails and water ways, encouraged or hindered the travelers, and influenced permanent settlements.
3. Rivers are the principal routes for transportation and wild animal trails prove useful when a new territory is being developed.
4. The established stopping points of the pioneer caravan became the sites of many of our modern towns and cities of the Middle West.
5. Pioneers were confronted by common dangers and organized for the protection and welfare of all. Wherever people engage in community life there must be a form of government.
6. The basic pattern for our democratic way of life had its foundation with the pioneers.
7. Great suffering and many hardships were met and overcome by the pioneers in the growth of the nation.
8. The United States of America became the nation that it is today not by the efforts of individuals but by many people working together for the good of all.
9. The Indians naturally resented the coming of the settlers. Hostility was met with hostility.
10. People have constantly improved their living conditions, their method of exchanging goods, and their means of transportation.
11. Wholesome family life and recreation are sought even under the most difficult living conditions.
12. Music, art, dances, and literature reflect the culture of the people and the history of the period in which they are created.

#### THINGS TO TALK ABOUT.

1. Why did people have a great desire to go westward?
2. Who were some of the early pioneers? Where did they go? What settlements did they establish? How did the caravans overcome the obstacles they met?

3. How did they travel? What guided their routes? How did the terrain, natural resources, trails, and waterways affect their trips and the settlement of the West?
4. What did they take with them? How did they get food and clothing?
5. How did they clear the land? How did they build homes? What was a typical pioneer home like?
6. What routes were much used? What waterways? Why were certain stopping places established? Where? Where were permanent cities built?
7. What means of transportation were used? What is meant by "fording a river"?
8. How did the pioneers organize for the protection and common good of all? What provision did they make for religion? For permanent government?
9. How did they solve the problems of communication? Of health? Of recreation?
10. How would a pioneer child's education compare with yours? (Do not forget the education that takes place outside school.)
11. Describe a typical pioneer woman's day; a man's; a child's.
12. What natural resources did the pioneers find, and how did they use them?
13. How did the program of National Parks begin?
14. In what ways have the pioneers from all places, settling all over the United States, influenced our culture, religion, literature, art, music, and dances?
15. What was the Louisiana Purchase; the Lewis and Clarke Expedition; the Zebulon Pike; Sam Houston; the work of the missionaries?
16. How and why did the pioneers irrigate the desert? How did they know that gold could be found in the West?

#### THINGS TO DO.

1. Read about pioneer days and ways, and report. Write sketches of books and characters. Dramatize a story.
2. Enjoy poems about the pioneers (e.g., "Western Wagons" by Benet) ; study pictures and sculpture (e.g., "Santa Fe Trail", by Young-Hunter, and "Appeal to the Great Spirit" by Dallin) ; learn songs, dances, and games of this era.
3. Collect, study, and display pictures; arrange an exhibit of pioneer articles from the Children's Museum in Boston; show film strips and moving pictures; construct a television stage, and make and show American puppets; have an exhibit of dolls dressed in different pioneer costumes; plan and exhibit a museum of many articles and exhibits.
4. Write original stories of pioneer life, or poems, or songs; keep a diary of the life of a boy or girl on the Oregon trail; compile a list of articles to be taken in the covered wagon.
5. Dramatize pioneer activities, such as clearing land, weaving, spelling bees; using a picture frame, pretend you are a picture of an explorer come to life to tell your adventures; learn recipes for common pioneer foods, and make johnny cake, apple butter, dried apples, butter, etc., at home or at school.
6. Make maps of the United States showing four main routes to the West; another showing growth of United States territory; others showing settlements, rivers, conditions of country, or any other facts brought out or needed in study.
7. Make dioramas showing phases of life; construct model of fort or stockade; paint murals to show activities; draw or paint illustrations of stories, poems, etc.
8. Take an imaginary trip over the Oregon Trail in pioneer times and another now. Figure distances, routes, time, speed, costs, etc. Compare, in the same way, the transportation of mail then and now.

9. List new words learned. List arithmetic practice gained.
10. Organize a biographical sketch of a famous pioneer.
11. Play the game of "20 Questions", using questions about pioneers and pioneer life.
12. Plan a pen pal exchange.
13. Display Norman Rockwell's Four Freedoms and discuss.
14. Make a time line showing dates of important events in the story of America.
15. Hold a New England Town Meeting. Settle some of the problems of the classroom.

#### SUGGESTIVE CULMINATING ACTIVITIES.

1. Have an illustrated lecture by pupils for parents or other classes, with all materials organized by the children.
2. Plan a shadowgraph dramatization, puppet show, or box "movie" of scenes from pioneer life, or from a story book about pioneers; e.g., any chapter from the book *ON TO OREGON* by Morrow.
3. Act out typical scenes in pioneer life: At Independence, Missouri; On the trail; Forging a river; Around the campfire; Attack by Indians; Building and settling in homes.
4. Present an original play, "On to Oregon".  
Scenes: In the colonies; On the trail; Settling in Oregon.
5. Make a book of information about pioneers to leave as a reference in the room. This might include pioneer songs, dances, and poems.
6. Act out the meeting of two wagon trains, one a Mormon group bound for Salt Lake, the other bound for Oregon. Sit around "campfire" and exchange stories, talk about routes, dangers, etc. Sing pioneer songs and dance a pioneer dance. Partake of johnnycake and butter prepared by the "women" of the wagon trains.
7. Present character sketches entitled "Who Am I?" in which individual pupils or small groups of pupils act out the achievement of prominent people of pioneer days or enact scenes from the life these people led. The class guesses who is being portrayed.
8. Have a States Fair. Collect many products and pictures. Invite another class. Have parade of floats on wagons, representing the States.

#### HABITS AND SKILLS TO BE DEVELOPED.

1. Planning work before starting it. Studying directions carefully. Proceeding independently when work is within scope of own ability.
2. Using the library frequently when seeking necessary information, and as a source of recreational reading.
3. Using the tools of reading such as index, contents, glossary, and pronunciation aids Using reference material effectively.
4. Consulting maps for location of areas being studied and discussed.
5. Listening with attentiveness while others are speaking.
6. Selecting ideas discriminatingly from material read.
7. Sharing ideas with members of group. Taking part in general discussion. Expressing ideas in own words.
8. Writing legibly; arranging material neatly and attractively.
9. Adding new words to vocabulary. Spelling words correctly.

## SAMPLE TESTS.

**Which Happened First?**

Below you will find pairs of statements. Read each pair carefully. Then put a cross (x) in the blank space before the event which happened first.

1. \_\_\_\_\_ Captain Sutter owned land in California.  
       \_\_\_\_\_ People rushed to California in great numbers.
2. \_\_\_\_\_ Utah became part of the United States.  
       \_\_\_\_\_ The Mormons founded Salt Lake City.

**Can You Find the One That is Wrong?**

In the following exercise a definition or a meaning is given at the left of the page, and at the right is a group of three words. Two of the three words fit the meaning of the definition. Cross out the word which means something different.

1. The flat land which is found in the middle of the North American Continent.      plains  
    prairie  
    pueblo
2. What pioneers used when going West.      covered wagons  
    whalers  
    handcars

**Quiz Yourself.**

Read each of the following incomplete sentences. Then draw a line under the word or group of words that makes the best ending for the sentence.

1. Trappers and hunters were the first to move westward because (a) they wanted to discover new lands; (b) they were interested in fur trading; (c) they were braver than their neighbors; (d) they wanted to fight Indians.

**Who Am I?**

Here are some sentences about persons you have studied. Can you tell who each is? Write the name of the person beside the sentence which tells about him. You may wish to use these sentences for a quiz program.

1. Because of the work I did, it was possible to build railroads and steamboats. I invented the first practical steam engine.  
    Who am I? \_\_\_\_\_
2. I am an inventor who made traveling by water quicker and easier. I invented the first practical steamboat.  
    Who am I? \_\_\_\_\_

**Can You Figure These Out?**

1. The Oregon Trail was about 2,000 miles long. If the pioneers traveled on an average of 20 miles a day, how long did it take to cross the trail?
2. John was a pioneer boy who crossed the Oregon Trail with his parents. He decided to keep a diary. If he wrote two pages each day, how many pages had he written when he reached Oregon? Use the answer you got for question number 1 to help you.
3. If a wagon train traveled 21 miles per day, how far did it go in a week?

## BIBLIOGRAPHY.

- Bailey, Carolyn S. HOMESPUN PLAYDAYS. Viking, 1941. (5-7)  
 Bailey, Carolyn S. PIONEER ART IN AMERICA. Viking, 1944. (5-8)  
 Barksdale, Lena. DARING RIDERS. Knopf, 1946. (3-5)

- Becker, May. GROWING UP WITH AMERICA. Lippincott, 1941. (6-9)
- Clark, Ann N. LITTLE NAVAJO BLUEBIRD. Viking, 1943. (4-6)  
Contemporary Indian.
- Coatsworth, Elizabeth Jane. FIVE BUSHEL FARM. Macmillan, 1939. (4-5)  
Pioneer days in Maine.
- Cook, James H. LONGHORN COWBOY. Putnam, 1942.
- Crawford, Phyllis. "HELLO, THE BOAT!" Holt, 1938. (5-7)  
Life on a river houseboat.
- Curtis, Alice B. CHILDREN OF THE PRAIRIE. Crowell, 1938. (5-6)  
Iowa Prairie.
- Daugherty, James H. DANIEL BOONE. Viking, 1939. (5-9)
- Eaton, Jeannette. NARCISSA WHITMAN, PIONEER OF OREGON. Harcourt, 1941.
- Garst, Doris S. SITTING BULL. Messner, 1946. (6-9)
- Hauck, Louise. LUCKY SHOT. Lothrop, 1931.  
Fort Bent, etc.
- Havighurst, Walter and Marion. HIGH PRAIRIE. Farrar, 1944. (4-7)  
1860, Pioneers in Minnesota and Dakota.
- Hayes, Florence. HOSH-KI. Random House, 1943. (5-8)  
Contemporary Navajo Indian boy who attends government school.
- Hayes, Marjorie. LITTLE HOUSE ON RUNNERS. Little, 1939. (4-6)  
The time of Andrew Jackson. The family takes a trip from Vermont to Boston.
- Higgins, Frances L. ONCE AT WOODBALL. Harper, 1935. (5-7)
- Holberg, Ruth L. TIBBY'S VENTURE. Doubleday, 1943. (3-5)  
1870 on Cape Ann in the home of a sea captain.
- Hubbard, Margaret. SERAPHINA TODD. Macmillan, 1941. (5-8)  
It was 1777 when the O'Kanes arrived in Texas. Mission days in the southwest.
- Hunt, Mabel L. LUCINDA, A LITTLE GIRL OF 1860. Lippincott, 1934. (5-7)  
A little Quaker girl in Indiana territory during Civil War.
- Judson, Clara. MICHAEL'S VICTORY. Houghton, 1946. (5-7)  
An Irish family come to America during mid-nineteenth century.
- Judson, Clara. THEY CAME FROM SWEDEN. Houghton, 1942. (5-7)  
Homesteading in Wisconsin about 1859.
- Kelty, Mary G. LIFE IN MODERN AMERICA. Ginn, 1941. (5-7)
- Kelty, Mary G. LIFE IN EARLY AMERICA. Ginn, 1941. (5-7)
- Kent, Louise. IN GOOD OLD COLONY TIMES. Houghton, 1941. (6-8)
- Lacey, Ida B. LIGHTS THEN AND NOW. Macmillan, 1930. (3-5)
- Lamprey, Louise. DAYS OF THE PIONEERS. Stokes. (6-8)
- Averill, Esther. DANIEL BOONE. Harper, 1945. (3-6)
- MacKaye, David L. JOHN OF AMERICA. Longmans, 1947. (6-9)  
Pioneer Virginia.
- Maw, Margaret. NIKOLINE'S CHOICE. Oxford, 1947. (5-7)  
Homesteading in the Danish settlement of Utah, 1880.
- McMeekin, Isabella. JOURNEY CAKE. Messner, 1942. (5-7)  
Kentucky, 1793. Johnny Appleseed is a character.
- Masters, Joseph G. STORIES OF THE FAR WEST. Ginn, 1935. (5-8)

- Meadowcroft, Enid. ALONG THE ERIE TOWPATH. Crowell, 1940. (4-6)  
In the 1820's.
- Meadowcroft, Enid. ON INDIAN TRAILS WITH DANIEL BOONE. Crowell, 1947.  
(3-5)
- Freeland, George E.; Walker, E. E.; and Williams, H. E.  
AMERICA'S BUILDING. Scribner's, 1937.  
The makers of our flag.
- Morris, Rhoda. SUSAN AND ARABELLA, Pioneers. Little, 1935.
- Morrow, Honore. ON TO OREGON! Morrow, 1926. (5-7)  
By covered wagon. Kit Carson met along the way.
- Nolan, Jeannette C. HOBNAILED BOOTS. Winston, 1939. (6-8)
- Orton, Helen F. LAD OF OLD WILLIAMSBURG. Stokes, 1938. (5-7)
- Seymour, Flora Warren. SAM HOUSTON, PATRIOT. Appleton-Century, 1930. (6-8)
- Seymour, Flora W. WE CALLED THEM INDIANS. Appleton-Century, 1940.
- Sickels, Evelyn R. SCHOOL BELL RINGS. Scribner's, 1942. (5-6)  
Life at school in many different periods.
- Turpin, Edna. LITTLING OF GAYWOOD. Random, 1939. (5-7)  
Colonial Virginia.
- Wilder, Laura. LITTLE HOUSE ON THE PRAIRIE. Harper, 1935. (4-6)  
Family settle in Indian territory in Kansas.
- Woodward, Hildegard. TIME WAS. Scribner's, 1941. (4-5)  
Inventions at the turn of the century.
- Young, Stanley. MAYFLOWER BOY. Rinehart, 1944. (6-8)

## GRADE 5.

### UNIT: BUILDING GOODWILL THROUGH AN UNDERSTANDING AND AN APPRECIATION OF THE NEGRO.

Note: Similar units may be worked out for any other nationality, in order to build a stronger feeling of good will in our elementary schools.

#### APPROACH.

We had been studying the processes through which cotton goes from the time the cotton seed is planted in the earth to the time cotton is made into cloth. We had been learning about the part the Negro played in the production of cotton. We found out that the South would never have become the rich section of our United States that it is today if it had not been for the help of the Negroes. Some children wondered whether Negroes were making contributions in other fields of endeavor as well as in the cotton industry. We decided to find out.

I needed only to ask the children one question before ideas came thick and fast. "What noted Negroes do you know?" brought many interesting answers. There were Joe Louis, Bob Montgomery, Duke Ellington, Marion Anderson, Paul Robeson, and Roland Hayes.

We looked through magazines, books and newspapers to find the names of other famous Negroes. LIFE, THE LADIES HOME JOURNAL, and the READERS' DIGEST helped us the most.

#### THINGS TO UNDERSTAND.

1. We need to be open-minded.
2. We must recognize the dignity of the individual Negroes and respect them as a group.



3. Negroes have made many contributions toward the welfare of their race and toward the good of mankind in general.
4. The Negro must face difficult problems in climbing to the top rung of his ladder.
5. When we know more about the Negroes, we shall bring about a better feeling on the part of other people in the world toward the Negroes.

#### THINGS TO TALK ABOUT.

1. Marion Anderson, Roland Hayes, Dorothy Maynor, and Duke Ellington are noted Negroes in the field of music.
2. Beauford Delaney and Augusta Savage are great artists.
3. Phyllis Wheatly, Countee Cullen, Paul Dunbar, and Langston Hughes are the Negroes' greatest poets.
4. Booker T. Washington is America's leading Negro educator.
5. Doctors Drew, Lawless, and Wright are outstanding doctors.
6. Dr. George Washington Carver made a great many important contributions in the field of science.
7. Mr. Robert Wright became America's first Negro bank president.
8. Negroes served in all wars since the Revolutionary War up to the present day. Many served their country valiantly. Dorrie Miller, Benjamin Davis, and his son were outstanding heroes in the last world war.
9. Negroes are making as great contributions in other fields of endeavor as they are making in the cotton industry — often greater.

#### THINGS TO DO.

1. Arrange bulletin boards of pictures brought in by both children and teacher.
2. Look up information about the various noted Negroes in all fields of endeavor.
3. Make a story book of stories we wrote on our findings.
4. Share our learnings by inviting the fourth, fifth, and sixth grades to an assembly program, at which time we told of the contributions the Negroes have made to the nation's culture.

#### EVALUATION.

**Reactions noted:** There were two interesting reactions I noted. One day the principal sent from the playground to the office a Negro, and several white boys who had been annoying him. The principal, upon returning to her office, found Donald, one of my boys, very red in the face and remorseful. He approached her immediately, saying: "I know just what you're thinking. After all I've learned about the Negroes, you think I shouldn't have been in this fight. I just didn't stop to think."

Donald's conscience troubled him; he knew we expected more of him than we did of the others. The study had done some good.

The other incident occurred toward the end of the unit, when another fifth grade joined us to prepare for a concert. Ella Maude was the only Negro child visiting our room for the first time. There were bulletin boards of noted Negroes as well as large charts containing facts we had learned. The two-part music continued, yet out of the corner of my eye, I was watching Ella Maude, whose mind seemed to be entirely taken up by what was on the bulletin board. My apprehension lessened when Ella Maude looked up at me with a radiant smile on her face. What she had seen had pleased her.

**Habits and skills strengthened:**

1. Learning to use newspapers, pamphlets, and magazines to good advantage.
2. Learning how to prove a point.
3. Learning to put ideas together so as to have an interesting report for the assembly program.
4. Giving a report with poise and confidence, speaking clearly and distinctly.
5. Learning to listen quietly while the victrola records are being played.
6. Co-operating and sharing in planning and carrying out the assembly program.

**BIBLIOGRAPHY.****Children's Books.**

- Bontemps, Arna. SAD FACED BOY. New York: Houghton Mifflin.
- Bontemps, Arna. POPO AND FIFINA. New York: Macmillan Co.
- Credle, Ellis. FLOP-EARED HOUND. New York: Oxford Press.
- Cuthbert, Marion. WE SING AMERICA. New York: Friendship Press, 156 Fifth Avenue, New York 10.
- Dunbar, Paul. POEMS FOR CHILDREN. New York: Dodd, Mead and Co.
- Graham, Lepscomb. GEORGE WASHINGTON CARVER, SCIENTIST. Julian Messner.
- Johnson, Weldon J. BOOKS ABOUT NEGRO CHILDREN. New York: Public Library
- Shackelford, Jane. CHILD'S STORY OF THE NEGRO. Washington, D.C.: Associated Publishers, 1538 9th Street, N.W.
- Sharpe, Stella. TOBE. North Carolina: University of North Carolina Press.
- Woodson, Carter. NEGRO MAKERS OF HISTORY. Washington, D.C.: Associated Publishers, 1538 9th Street, N.W.

**Teachers' Books.**

- Brown, Sterling. NEGRO CARAVAN; Anthology of Negro Folklore. New York: Dryden Press.
- C.I.O. Bulletin. WORKING AND FIGHTING TOGETHER REGARDLESS OF RACE, COLOR, AND CREED. Washington, D.C.: C.I.O. Headquarters.
- Cullen, Countee. OPEN DOOR TO POETRY. New York: Scribner's Sons.
- Cullen, Countee. CAROLING DUSK. New York: Harpers, 1927.
- Dunbar, Paul. COMPLETE SET OF POEMS. New York: Dodd, Mead and Co.
- Eleazer, R. SINGERS IN THE DAWN. Atlanta, Georgia: 710 Standard Building.
- Locke, Alan. NEW NEGRO (Negro's Creative Gifts.)
- Nelson and Cole. NEGRO'S CONTRIBUTION TO MUSIC IN AMERICA. New York: Bureau of International Relations.
- Ottley, Roi. A NEW WORLD A'COMIN'. New York: Houghton Mifflin.
- Washington, Booker T. UP FROM SLAVERY. Sun Dial Press.

**GRADE 5.****AUDIO-VISUAL AIDS.**

The following films and transcriptions listed as aids in the Social Studies Curriculum are available from the Office of Radio Audio-Visual Aids in the State Department of Education Building at 200 Newbury Street, Boston 16, Massachusetts. All transcriptions are on 16 inch

discs, requiring a dual speed playback machine (78 r.p.m. and 33-1/3 r.p.m.) for playing. Record albums are on regular 78 r.p.m. discs. All films are 16mm. width and sound.

#### FILMS.

- A 5 Hopi Arts and Crafts, 10 min., color
- A 6 The Making of a Mural, 10 min., color
- G 4 Navajo Indians, 10 min., black and white
- L i Choosing Books to Read, 10 min., color
- Sc 17 How We Get Our Power, 10 min., black and white
- G 3 The Wheat Farmer, 10 min., black and white
- Sc 20 Story of Electricity, 10 min., black and white
- So 7 Colonial Children, 10 min., black and white
- So 14 Mr. Bell, 20 min., black and white
- So 17 The White House, 19 min., black and white
- So 35 Democracy, 10 min., black and white
- So 36 Christopher Columbus, 19 min., black and white
- So 39 Kentucky Pioneers, 10 min., black and white
- So 42 Air Power is Peace Power, 30 min., color
- So 43 The Perfect Tribute (Abraham Lincoln), 20 min., black and white
- So 44 Land of Liberty, (in 4 parts) 20 min. each, black and white

#### TRANSCRIPTIONS.

- AMERICAN ADVENTURE SERIES (15 minute programs)
- LEST WE FORGET SERIES (on Famous Early Americans — 15 minutes)
- OUR CONSTITUTION (15 minute programs)
- OUR NATION'S SHRINES (15 minute programs)
- THESE GREAT AMERICANS (15 minute programs)
- LIVING LITERATURE (Discussion programs by Professor Scammel, 15 minutes)
- FAVORITE STORY SERIES (One half hour programs)
- Legend of Sleepy Hollow, Huckleberry Finn, Tom Sawyer, Connecticut Yankee, Moby Dick, Man Without A Country, Lady of the Lamp
- SEEING AMERICA SERIES (15 minute programs)
- MUSIC (Regular phonograph record albums)
- On wings of Song, Indian Music of the Southwest, Indian Music, Patriotic Songs

In addition to the films and transcriptions listed, teachers will find great help in choosing audio-visual aids for use in the social studies in the following sources:

1. EDUCATIONAL FILM GUIDE, H. W. Wilson Co., New York. An annual listing of films with monthly supplements. This guide lists films alphabetically by title and subject and includes, in many cases, a review of the film by scholastic magazines. Local distributors for the films are also given.
2. FILMSTRIP GUIDE, H. W. Wilson Co., New York. An annual listing of filmstrips with monthly supplements of the same type as described above.
3. EDUCATOR'S GUIDE TO FREE FILMS, Educators Progress Service, Randolph, Wisconsin. An annual listing of all sponsored films which are available for rental for the cost of postage only. Although they contain some advertising of the Sponsor's product, they are excellent films.
4. LIST OF EDUCATIONAL RECORDINGS FOR MORE EFFECTIVE LEARNING, Educational Service, 1702 K Street, N. W., Washington 6, D. C. An annual listing of recordings which may be purchased by educators. Prices are given.

5. UNITED STATES OFFICE OF EDUCATION, Radio Section, Washington 25, D. C. Information on Transcriptions available and general help in any question concerning radio programs, scripts, recordings, and transcriptions.

## GRADE 5.

### BIBLIOGRAPHY.

#### Fiction.

- Angelo, Valenti. THE BELLS OF BLEEKER STREET. New York: Viking, 1949.
- Barnes, Nancy (pseud.) WONDERFUL YEAR. New York: Messner, 1946.
- Bianco, Margery. FORWARD, COMMANDOS! New York: Viking, 1944.
- Bonner, Mary Graham. THE MYSTERIOUS CABOOSE. New York: Knopf, 1949.
- Carr, Mary Jane. CHILDREN OF THE COVERED WAGON. New York: Crowell, 1934.
- Clark, Ann Nolan. LITTLE NAVAJO BLUEBIRD. New York: Viking, 1943.
- Coblentz, Catherine Cate. THE BLUE CAT OF CASTLE TOWN. New York: Longmans, 1949.
- Credle, Ellis. HERE COMES THE SHOWBOAT. New York: Nelson, 1949.
- Daugherty, James. THE WILD, WILD WEST. McKay, 1948.
- DeAngeli, Marguerite. ELIN'S AMERIKA. New York: Doubleday, 1941.
- Edmonds, Walter Dumaux. MATCHLOCK GUN. New York: Dodd, Mead, 1941.
- Estes, Eleanor. THE MOFFATS. New York: Harcourt, Brace, 1941.
- Eyre, Katherine Wigmore. LOTTIE'S VALENTINE. New York: Oxford, 1941.
- Faulkner, Georgene. MELINDY'S HAPPY SUMMER. New York: Messner, 1949.
- Friedman, Frieda. A SUNDAE WITH JUDY. New York: Morrow, 1949.
- Frost, Frances. SLEIGH BELLS FOR WINDY FOOT. New York: Whittlesey, 1948.
- Gates, Doris. BLUE WILLOW. New York: Viking, 1940.
- Henry, Marguerite. JUSTIN MORGAN HAD A HORSE. Follett, 1945.
- Holling, Holling C. SEABIRD. New York: Houghton, 1948.
- Holling, Holling C. TREE IN THE TRAIL. New York: Houghton, 1942.
- Judson, Clara. LOST VIOLIN. New York: Houghton, 1947.
- Lenski, Lois. JUDY'S JOURNEY. Philadelphia: Lippincott, 1947.
- Lenski, Lois. STRAWBERRY GIRL. Philadelphia: Lippincott, 1945.
- Lovelace, Maud H. DOWN TOWN: a Betsy-Tacy story. New York: Crowell, 1943.
- McCloskey, Robert. HOMER PRICE. New York: Viking, 1943.
- McLelland, Isabel Couper. TEN BEAVER ROAD. New York: Holt, 1948.
- Martin, Ethel Bowyer. JUDY-COME-LATELY. New York: Harcourt, 1949.
- Meadowcroft, Enid LaMonte. ALONG THE ERIE TOWPATH. New York: Crowell, 1940.
- Meadowcroft, Enid LaMonte. BY SECRET RAILWAY. New York: Crowell, 1948.
- Meigs, Elizabeth Bleeker. THE WHITE WINTER, a story of Scarlet Hill. Bobbs-Merrill, 1948.
- Moon, Grace Purdie. CHI-WEE; the adventures of a little Indian girl. New York: Doubleday, 1925.
- Morrow, Honore Willis. ON TO OREGON; new ed. New York: Morrow, 1946.
- Neilson, Frances Fullerton. GIANT MOUNTAIN. New York: Dutton, 1946.

- Newell, Hope. STEPPIN AND FAMILY. New York: Oxford, 1942.
- Pauli, Hertha. THE GOLDEN DOOR; a story of Liberty's children. New York: Knopf, 1949.
- Van Stockum, Hilda. THE MITCHELLS. New York: Viking, 1945.
- Wilson, Hazel. ISLAND SUMMER. Abingdon, 1949.

### Non-Fiction.

- Baker, Nina Brown. TEN AMERICAN CITIES: THEN AND NOW. New York: Harcourt, Brace, 1949.
- Benet, Rosemary and Stephen Vincent. BOOK OF AMERICANS. New York: Farrar, 1933.
- Carmer, Carl Lamson, coll. AMERICA SINGS; stories and songs of our country's growing. New York: Knopf, 1942.
- Chase, Richard, comp. HULLABALOO AND OTHER SINGING GAMES. New York: Houghton, 1949.
- Clark, Marion G. WESTWARD TO THE PACIFIC. New York: Scribner, 1932.
- Coffman, Ramon Peyton. CHILD'S STORY OF THE HUMAN RACE. New York: Dodd, 1927. o.p. 1946.
- Dalglish, Alice. AMERICA TRAVELS; the story of 100 years of travel in America. New York: Macmillan, 1933.
- Duvoisin, Roger Antoine. THEY PUT OUT TO SEA; the story of the map. New York: Knopf, 1943.
- Eaton, Jeanette. THAT LIVELY MAN, BEN FRANKLIN. New York: Morrow, 1948.
- Fisher, Lois. YOU AND THE UNITED NATIONS. Children's Press, 1947.
- Fitch, Florence Mary. ONE GOD. Lothrop, 1944.
- Hager, Alice Rogers. WASHINGTON, CITY OF DESTINY. New York: Macmillan, 1949.
- Hall-Quest, Olga W. HOW THE PILGRIMS CAME TO PLYMOUTH. New York: Dutton, 1946.
- Hall-Quest, Olga W. SHRINE OF LIBERTY, THE ALAMO. New York: Dutton, 1948.
- Hartman, Gertrude. THESE UNITED STATES AND HOW THEY CAME TO BE. New York: Macmillan, 1935.
- Henius, Frank. SONGS AND GAMES OF THE AMERICAS. New York: Scribner, 1943.
- Henry, Marguerite. BENJAMIN WEST AND HIS CAT GRIMALKIN. Bobbs-Merrill, 1947.
- Holling, Holling C. BOOK OF INDIANS. Platt, 1935.
- Jagendorf, M. NEW ENGLAND BEAN POT. Vanguard, 1948.
- Jones, Louis C. SPOOKS OF THE VALLEY. New York: Longmans, 1948.
- Kelty, Mary Gertrude. STORY OF THE AMERICAN PEOPLE. New York: Ginn, 1937.
- Lansing, Marion. MAKERS OF THE AMERICAS. Boston: Heath, 1947.
- McGuire, Edna. BRAVE YOUNG LAND. New York: Macmillan, 1946.
- McGuire, Edna. A FULL-GROWN NATION. New York: Macmillan, 1946.
- McNeer, May Yonge. STORY OF FLORIDA. New York: Harper, 1947.
- McNeer, May Yonge. STORY OF THE GREAT PLAINS. New York: Harper, 1943.
- Malcolmson, Anne. YANKEE DOODLE'S COUSIN. New York: Houghton, 1941.
- Marriott, Alice. INDIANS ON HORSEBACK. New York: Crowell, 1948.

- Meadowcroft, Enid. *ON INDIAN TRAILS WITH DANIEL BOONE*. New York: Crowell, 1947.
- Peck, Anne Merriman. *YOUNG MEXICO*; enl. ed. New York: Dodd, 1948.
- Petersham, Maud and Miska. *AMERICA'S STAMPS*. New York: Macmillan, 1947.
- Petersham, Maud and Miska. *STORYBOOK OF THE THINGS WE USE*. Chicago: Winston, 1933. o.p. 1946.
- Petersham, Maud and Miska. *STORYBOOK OF WHEELS, SHIPS, TRAINS, AIRCRAFT*. Chicago: Winston, 1935. o.p. 1946.
- Quinn, Vernon. *PICTURE MAP GEOGRAPHY OF THE UNITED STATES*. Philadelphia: Lippincott, 1931.
- Sanchez, Nellie. *STORIES OF THE STATES; TALES OF EARLY EXPLORATION AND SETTLEMENT*; rev. ed. New York: Crowell, 1941.
- Sickels, Evelyn Ray. *SCHOOL BELL RINGS*. New York: Scribner, 1942.
- Stone, Gertrude Lincoln. *EVERYDAY LIFE IN THE COLONIES*. Boston: Heath, 1905.
- Stull, DeForest, and Hatch, R. W. *JOURNEYS THROUGH NORTH AMERICA*. New York: Allyn, 1941.
- Train, Arthur Kissam. *STORY OF EVERYDAY THINGS*. New York: Harper, 1941.
- Turpin, Edna. *THE STORY OF VIRGINIA*. New York: Random, 1949.
- Webster, Hanson Hart. *TRAVEL BY AIR, LAND, AND SEA*. New York: Houghton, 1938.
- Witty, Paul and Kohler, Julilly. *YOU AND THE CONSTITUTION OF THE UNITED STATES*. Children's Press, 1948.

These books may be borrowed from local school and public libraries or, when not available at these sources, from the Massachusetts Division of Public Libraries, Department of Education, 200 Newbury Street, Boston, Massachusetts.

#### **References for Teachers.**

- Children's catalog; seventh edition revised, 1946 and supplements. Reference.
- State Certificate Reading List, 1948 and supplements. Free copies available at State Division of Public Libraries.
- A Tree of Books, a book list for boys and girls. Gloucester, Massachusetts, 1948. 75 cents.
- Junior Booklist of the Secondary Education Board, Milton, Massachusetts. Single copies, 20 cents.
- Reader's Guide to Periodical Literature. Reference.
- The Education Index. Reference.

**GRADE 6. OVERVIEW CHART.**

SUBJECT MATTER AREA: OUR NEIGHBORS TO THE NORTH AND TO THE SOUTH OF US.

AREA OF GROWTH: HUMAN RELATIONSHIPS AND SELF-REALIZATION.

MAJOR FIELDS	UNDERSTANDINGS.
HOW AND WHY PEOPLE SETTLE IN NEW PLACES.	The Americas were inhabited by many people of different civilizations before Europeans came. What were they like? Explorers and settlers from England, France, Spain, Italy, and Portugal and later from other countries, brought their ideas and customs to the New World. How did they affect the development of different parts of the Americas?
HOW PEOPLE PROVIDE FOR THEIR HOME AND FAMILY LIFE.	All people have basic patterns for maintaining homes and families. How are these similar in different climates and geographical areas, and how do they differ? How were early settlements established?
HOW PEOPLE OBTAIN AN EDUCATION.	Study schools and cultures in different countries, together with current status of education among the peoples, and plans for improvement.
HOW PEOPLE PROVIDE FOR THEIR HEALTH, PROTECTION, AND GENERAL WELFARE.	In all these countries, health and welfare conditions are being studied and improved. What is being done?
HOW PEOPLE USE THEIR LEISURE TIME.	Recreational and leisure-time activities are influenced by climate, surroundings, and tradition. How is this shown?
HOW DIFFERENT RACIAL AND NATIONAL GROUPS BENEFIT BY EXCHANGE OF IDEAS AND CULTURES.	Each group has its distinctive culture. Within a nation or among nations life is enriched if cultures, ideas, and resources are pooled. Air-travel has made us far more familiar with the cultures of other people than we were before.

AREA OF GROWTH: ECONOMIC EFFICIENCY:

HOW ENVIRONMENTAL INFLUENCES DETERMINE GROWTH AND DEVELOPMENT OF NATIONS.	All units should include the effect of climate, topography, and other environmental features. The control of environment and the use of resources should be studied.
HOW PEOPLE EARN A LIVING.	Study the industries, occupations, and general economy of each country, and compare with other countries and with the United States. Economic development is dependent upon climate, topography, people, resources, and relations with other countries.

MAJOR FIELDS	UNDERSTANDINGS.
HOW PEOPLE BECOME INCREASINGLY INTER-DEPENDENT.	No country is sufficient to itself. Security and living standards improve when nations share the world's riches.
HOW PEOPLE USE AND CONTROL THEIR NATURAL RESOURCES.	Every country, if it is to prosper, must develop and control its natural resources. It must have materials to use and to exchange fairly with other countries.

AREA OF GROWTH: CIVIC RESPONSIBILITY.

HOW CITIES AND TOWNS GROW AND DEVELOP.	Many interesting and important cities should be located and studied. Origin, growth, and people are important. Air-travel has made us more conscious of these hitherto far-away places.
HOW PEOPLE GOVERN THEMSELVES.	All people have rights and obligations. Their governments define and protect these. How are the Americas governed? Alaska—a territory, perhaps soon a state; Canada—one of the British Commonwealth of Nations; Mexico—a republic. Others. Pan-American Union. United Nations. Monroe Doctrine.

**GRADE 6. SUGGESTED UNITS.**

The following units are suggestive only. They include some short, specific topics; but many can be expanded if desired, to include several Major Fields.

1. The Indian civilizations of different parts of the Americas.
2. Any group of early settlers or explorers.
3. Mexico, our good neighbor to the south.
4. Canada, our friendly neighbor to the north.
5. Alaska—why is it becoming so important to us?
6. A Mexican family travels with the crops in the United States.
7. An engineer's family goes to live in Mexico.
8. The Middle Andean nations.
9. Some products of South America important to us; e.g., coffee, rubber, or bananas.
10. Life in the Amazon valley.
11. Why do Canada and the United States live together in so friendly a way? What might happen if they did not? How do they work together for mutual help?
12. How do air lines bring nations together? Where are the great airports? May they make a difference in the growth of cities? What do they carry? Who travel by air, and how many?
13. What is the Pan American Union? What does it do?



**GRADE 6.****SAMPLE UNIT: HOW THE PEOPLE OF THE UNITED STATES AND CANADA WORK TOGETHER FOR PEACE AND PROSPERITY.**

## THINGS TO UNDERSTAND.

1. It is necessary for the people of the United States and Canada to work together if they are to enjoy peace and prosperity.
2. Canada is a large country extending from the northern boundary of the United States to the Arctic regions, and from the Atlantic Ocean to the Pacific Ocean. Because of its position, it is a land of short summers and long, cold winters.
3. One-half of the population of Canada live in cities near the southern part of the country.
4. Grain farming is the foundation of Canada's prosperity and importance. Canada exports more wheat than any other country in the world.
5. Canada's natural resources are forests, minerals, furs, fish, and scenic beauty.
6. There are three thousand miles of unfortified border between the United States and Canada. This is true of no other two countries in the world.
7. Canada's government is much like that of the United States.
8. The United States and Canada are interdependent in economic efficiency.
9. Canada is a new nation and has unlimited potentialities for growth and development.
10. The recreational facilities have been developed for the fullest enjoyment of the people.
11. The church plays a prominent part in the daily living of the people.

## THINGS TO TALK ABOUT.

(Have children make a list of questions.) Examples:

1. Who discovered Canada?
2. Who were the first settlers? Where did they settle? Why did they settle there?
3. What languages are spoken in Canada?
4. What are their homes like? Do they celebrate the same holidays that we do?
5. What are the schools like?
6. What games do they play? In what sports are they interested?
7. Why is Canada called a land of church-going people?
8. What are the natural resources?
9. How do Canadians make a living?
10. What products are exported and imported?
11. Where are the important cities? Why did these cities grow? Are they as modern as ours?
12. What means of transportation are used?
13. What is the climate like? What is the topography of Canada?
14. How are they governed?
15. Do they have community drives as we do? What are their civic agencies for promoting the welfare of the people?
16. Who are their famous men and women, and what did they do? What is their famous literature?

17. What natural wildlife does one find in Canada?
18. Why do tourists like to visit Canada?

#### THINGS TO DO.

1. Make time lines of own lives, teacher's, parents', grandparents' lives. Make time lines of the events in the history of Canada and the United States.
2. Listen to recording "Dominion of Canada", and a recording of the national anthem. See motion pictures, film strips, slides on Canadian life.
3. Make relief maps and rainfall graphs.
4. Make diorama showing contrast of population in various parts of Canada and the United States.
5. Correspond with children in Canada.
6. Ask a parent to give illustrated talk on Canadian trip.
7. Find out number of children, parents, grandparents who came from Canada. Locate regions on map.
8. Make a map showing the number of people of different nationalities living in Canada.
9. Read parts of "Evangeline" to class.
10. Learn Canadian songs and dances.
11. Secure library books from local and state libraries.
12. Draw Canadian flag.
13. Bring things from home that have been made in Canada. Collect Canadian postcards.
14. Make slides on cellophane that portray what people do for a living.
15. Use references, atlases, maps, road maps, train, and airplane time tables. Plan a trip by air, boat, train, car, or bus to Canada.
16. Make a map showing how goods are exported. (Boats can be filled with fur, lumber, wheat, etc.)
17. Obtain exhibit on "Canadian Children" from Children's Museum, Jamaica Plain, Boston.
18. Plan, write, and present a play, pageant, or shadow play on important facts to remember about Canada. Invite other children in school and parents to see it.

#### BIBLIOGRAPHY.

- Bonner, Mary Graham; CANADA AND HER STORY. Knopf, 1942. (History, geography, occupations, and present-day life in Canada.)
- Carpenter, Frances; CANADA AND HER NORTHERN NEIGHBORS. American Book Co., 1946. (Geographical and historical background, also relationships with the United States.)
- Dalglish, Alice; BLUE TEAPOT. Macmillan. (A story of the Bay of Fundy.)
- Dickson, Helen; UP CANADA WAY. D. C. Heath, 1942. (Life and customs of British Columbia — brought out through the stories of boys and girls who live there.)
- Gilchrist, Marie Emile; STORY OF THE GREAT LAKES. Harper, 1942. (Steel, iron, and shipbuilding industries.)
- Harris, Leila and Harris, Walter K.; CANADIAN WAYS. McKnight, 1939. (Economic geography, life on French-Canadian farm, lumbering and pulp industry, fishing, agriculture, and national parks.)

- Henry, Marguerite; CANADA IN STORY AND PICTURES. Whitman, 1942.
- Kingman, Lee; PIERRE PIDGEON. Houghton Mifflin Co. (Story of a boy who lived in Gaspé Peninsula in Canada.)
- Peck, Anne Merriam; YOUNG CANADA. McBride, 1943. (Life in provinces, industries, and geography.)
- Pinkerton, Katherine Sutherland; ADVENTURE NORTH. Harcourt, 1940. (Story of a family who built a log cabin in Canadian wilds of Ontario.)
- Quinn, Vernon; PICTURE MAP GEOGRAPHY OF CANADA AND ALASKA. (Historical background, physical features, resources, and industries.)
- Skinner, Constance Lindsay; BEAVERS, KINGS AND CABINS. Macmillan, 1940. (Adventures of the early French and English fur traders and the role they played in developing the country by contributing their languages and ideas. Also this book describes their dealings with the Indians.)
- Thorp, Louise Hall; CHAMPLAIN: NORTHWEST VOYAGER. Little, 1944. (Biography, tale of ships and seafaring men.)
- White, Stewart E.; MAGIC FOREST. Macmillan. (Adventures of a little boy among friendly Indians in a Canadian forest.)

## GRADE 6.

### SAMPLE UNIT: MEXICO AND HER PEOPLE. GOOD NEIGHBOR TO THE SOUTH.

The following unit on Mexico, as outlined, includes both geographic and historic data. In order to understand who these people are, how they live, and why they live as they do, it is necessary to learn something of the history of the country, the Indians who were found there (Toltecs, Aztecs, Mayas, and others), and the reason for so much that is Spanish in the country today. Out of this knowledge and appreciation there may grow an understanding which, it is hoped, may help to develop, at least in some small way, an attitude of tolerance and respect toward those whose ways of living differ in certain respects from our own.

Activities may be chosen from several fields; as, for example, the social studies, reading, language, art, and music. Through a varied choice of these activities, it is possible to formulate a well-balanced unit which will provide for the development of wider interests and broader experiences. Furthermore, the personal experiences of the children and their contacts with many books while the unit is in progress, should serve to broaden their horizons and widen their reading experiences, thus offering leads to further learning.

#### POSSIBLE APPROACHES.

One cannot always foresee what problems may arise, but the wise teacher will be constantly alert to the leads which the children may furnish, for through them can be made some of the most logical approaches to new problems or units of work. If none are forthcoming, then it remains for the teacher to so set the stage that a problem will arise. It was with this in mind that the following possibilities for approaches were listed.

#### Teacher Initiated Approaches.

1. Tell the children about a new book, or one unfamiliar to them, that is connected with Mexico. Read enough to stimulate interest or to introduce a problem.
2. Arrange an exhibit of Mexican articles, having no labels or explanations in order to arouse curiosity or to stimulate interest.
3. In the discussion of maps it would be easy to lead to the location of our own country,

and from that to develop an interest in our neighboring countries, thus starting from a geographic standpoint.

4. The unit might be approached through history, the previous study of Columbus. In this way one could proceed from the known to the unknown, leading first to the historical background of Mexico; that is, North America before the time of Columbus.

5. "Our Weekly Reader" sometimes has articles pertinent to the topic about to be introduced. An article in this paper could well be used as an approach to a unit.

6. Some teacher, or other person who has traveled in Mexico, could be invited to speak to the class or show pictures taken during travel. This should be followed by discussion, during which there could be built up a desire to know more.

7. The group might be invited by another class to witness with them a moving picture on some phase of work in Mexico such as "The Arts and Crafts of Mexico" or "The Making of Hemp". In the discussion, a desire could be aroused by the teacher to know more about the country with which these things were associated. The teacher might wish to introduce the unit by showing a picture of such a type to the class for herself.

8. Activities in other subjects might offer an approach to the new unit. For instance, a series of seasonal nature lessons in connection with Thanksgiving could furnish a lead to the study of Mexico, since both our pumpkin and wild turkey came to us, originally, from Mexico.

#### **Pupil Initiated Approaches.**

9. A child may wish to read or report to the class a Mexican story which has been found interesting.

10. A child may have some treasure from Mexico which he has brought to school to display.

#### **THINGS TO UNDERSTAND.**

1. The climate and topography affect the way people live in Mexico.

2. The oldest civilization in America existed in Mexico. Mexico is a much older nation than the United States.

3. Indians live in Mexico.

4. Spanish explorers came to Mexico. Mexican life, language, art, music, and dress have been influenced by Indian and Spanish culture.

5. Mexico is called a "land of contrasts."

6. Mexico has many natural resources that have great possibilities for development.

7. There is a marked distinction of classes of people in Mexico.

8. Mexico is improving educational opportunities for its people.

9. In war times and in peace times Mexico is a good neighbor.

10. The interdependence of the people of the United States and of Mexico is increasing.

#### **THINGS TO TALK ABOUT.**

1. How does the climate of Mexico affect the life and customs of the people?

2. How large is Mexico? How many people live in Mexico? Compare the population of Mexico and the United States.

3. How do the physical features of Mexico affect the life of the people?

4. What are the natural resources?

5. Are there any large cities in Mexico?

6. What are some characteristics of the people? In what ways are they like us?
7. What is the chief religion?
8. Compare the conveniences of people traveling in the United States with those of people traveling in Mexico.
9. What is a serape? A sombrero? Why are they worn?
10. How do the Mexicans celebrate holidays; how do the boys and girls dress? How many holidays are there?
11. What is a Mexican meal like?
12. What are the chief occupations of the people?
13. Why is commerce so retarded?
14. Compare the government of Mexico with that of the United States?
15. What are some of Mexico's chief needs?

#### SUGGESTED ACTIVITIES.

1. Write letters for free material or inexpensive booklets concerning Mexico.
2. Make a bibliography of books in our room and school library having information about Mexico.
3. Collect pictures of Mexico for a file, album, or bulletin board. Arrange a bulletin board, or exhibit table.
4. Make an excursion to a museum to see a Mexican display.
5. Use the typewriter to type cards for exhibits, legends for pictures on bulletin boards, or material for the class book; or letter these signs.
6. Read stories or use reference books; read silently or orally, and give oral reports.
7. Make a chart or series of maps showing routes of Cortez and extent of his conquests; relief map showing where centers of population have developed; a product map.
8. Organize individual booklets to include stories, creative drawings, bibliographies, mimeographed tests, etc. Create Mexican designs for covers.
9. Dress Mexican dolls. Experiment with natural dyes; weave and dye cloth for serapes.
10. Make Mexican-style pottery from clay, and decorate with original Mexican-style designs.
11. Organize a lecture. Make lantern slides.
12. Have a quiz program conducted by the children, to review some of the facts learned.
13. Take an imaginary trip into Mexico. Keep a diary of the trip.
14. Reproduce on sand table some aspect of life among the Mexicans, showing the people at work. (Ex.: a representative portion of a hacienda.) Create background scene with chalk or poster paint.
15. Make creative drawings for the class book of events in history, or of present-day activities. Make a mural or frieze.
16. Witness sound or silent films on Mexico. Listen to Spanish or Mexican music.
17. Grind corn, using the primitive method to realize how it was done.
18. Make simple graphs. (Ex.: a circle graph showing the portion of the world's silver from Mexico.)
19. Arrange a miniature cactus garden for the schoolroom or the market.
20. Make puppets for a puppet show. Make the necessary characters for a shadow-graph.

21. Plan how to receive guests at Open House, and organize procedure. Make posters.
22. Weave small baskets for the market or exhibit table.
23. Write and dramatize a story. Make the costumes.

#### CULMINATING ACTIVITIES.

1. Make a book of information on Mexico to leave as a reference for next year's class.
2. Have an illustrated lecture for parents or other classes. Use either slides, or the opaque projector with illustrated material organized by the children.
3. Make a shadowgraph dramatization of some Mexican story, or of scenes from history: as, for example, Cortez in Mexico, his meeting with Montezuma, or his march against the Aztecs. (For graphic accounts of Cortez in Mexico see Edna McGuire's *A BRAVE YOUNG LAND*; also *OUR NATION BEGINS*, by Barker, Dodd, Webb. See bibliography.)
4. Have a puppet show, the puppets and dramatization being the results of children's activities.
5. Hold "Open House" to other classes in the building, or to the parents, to show and explain the various exhibits in the room.
6. Have a Mexican Market, with children in costume. Actually sell the articles made by the children, to raise money for such purposes as the dental clinic, the library fund, or to buy a film to make a movie of some school or class activity.

#### SAMPLES OF OBJECTIVE TESTS.

##### Matching Tests.

1. In the right hand column are groups of words that tell about the names in the left-hand column. Place each name beside the words that tell about it.

Sample:

Cortez	_____	was the king of the Aztecs
Montezuma	_____	was a Spanish explorer
	_____	was the war god of the Aztecs

2. Here is a list of words:

altitude	jungle	tropics
plateau	volcano	barren

Put each word in the right place in the sentences below:

Sample: This word means high, level land. The word is \_\_\_\_\_

3. Match the words in the two columns below. Draw a line from the Mexican word in the left hand-column to the right meaning in the opposite column.

Sample: maguey	kidney beans
frioles	a Mexican hat
tamales	a cactus-like plant
sombrero	

##### Multiple Choice.

1. Only one of three answers in a group is correct. Show the one you would choose by underlining it.

Sample: Popocatapetl is the name of  
 a. a city      b. a volcano      c. a Mexican hero.

2. Draw a line under the word that you think is the correct answer.

Sample: Most people in Mexico speak  
 a. English      b. Spanish      c. French

**True-False Tests.**

1. Write **yes** before the sentences that are true, and **no** before those that are false.  
 Sample: \_\_\_\_\_ Mexico is of importance to the United States.  
           \_\_\_\_\_ Mexico is one half as large as the United States.

**BIBLIOGRAPHY.**

- CHILDREN'S BOOKS IN ENGLISH ON LATIN AMERICA. Washington, D. C.: Pan American Union, 1941. An annotated list of 324 titles classified according to country. Suitable for high school as well as elementary school children. 48 pages, 50c.
- LATIN AMERICAN BACKGROUNDS. Washington, D. C.: National Education Association, 1941. This bibliography contains an annotated, graded list of over one hundred books on the Latin American countries. They are classified by topics, such as Travel, Biography, etc. It also includes teaching aids. 25c.
- MEXICO: A BIBLIOGRAPHY. Compiled by Linwood Chase. Boston: Boston University. It contains children's books, as well as books for the teacher, magazine references, and free and inexpensive teaching aids. An annotated bibliography of 13 pages. 10c.
- SUBJECT INDEX TO BOOKS FOR INTERMEDIATE GRADES. Compiled by Eloise Rue. Chicago: American Library Association, 1940. Listed by subjects: graded.
- THIRTY CHILDREN'S BOOKS FROM LATIN AMERICA. Chicago: American Library Association, Section for Library Work with Children. 520 North Michigan Avenue, Chicago, 1940.

**Books for the Teacher.**

- Beale, Marie. FLIGHT INTO AMERICA'S PAST. New York: Putnam, 1932. \$3.50. Part One is about the Incas; Part Two about Yucatan. The author travelled to South America, then to Yucatan. Excellent pictures of stelae and monoliths. Gives a good idea of some of the treasures unearthed by archaeologists.
- Chase, Stewart and Tyler, Marian. MEXICO: A STUDY OF TWO AMERICANS. New York: Macmillan Co., 1933. \$1.00. Comparison of the two civilizations of this hemisphere—the one based on handicraft, the other on the machine.
- Lansing, Marion. LIBERATORS AND HEROES OF MEXICO AND SOUTH AMERICA. Boston: L. C. Page and Co., 1941. \$3.00. This book tells of men who played leading parts in the making of Mexico's history. One is Hidalgo, the priest who turned liberator. Informative and interesting. Well illustrated.
- Moats, Leone and Alice L. OFF TO MEXICO. New York: Charles Scribner's Sons, 1940. \$3.00. A guide book leading to all corners of Mexico. Well-planned trips, with colorful pictures, maps, and adequate background material. Necessary information for travelers.
- Parkes, H. B. A HISTORY OF MEXICO. Boston: Houghton Mifflin, 1938. \$3.75. A readable, well organized history from earliest known times to the spring of 1938.
- Stephens, Kate. THE MASTERING OF MEXICO. New York: Macmillan Co., 1916. Interesting reading. Tells of Cortez and his voyages. Good for supplementary reading by superior readers or by the teacher. See Chapters 1, 2, 3.

**Children's Books.**

- Armer, Laura Adams. THE FOREST POOL. New York: Longmans Green & Co., 1938. \$2.00. Two Mexican children attempt to catch an iguana for their zoo. Beautifully illustrated.

- Bannon, Laura. *MANUELA'S BIRTHDAY*. New York: Junior Literary Guild and Albert Whitman & Co., 1939. \$2.00. A little girl celebrates her birthday in Taxco. Pictures interesting to children. Intermediate.
- Barnum, Frances C. *JUAN AND JUANITA*. Boston: Houghton Mifflin, 1935. The story of the capture of two real Mexican children by Comanche Indians. This story is founded on fact. Tells of life on a hacienda. Intermediate. \$.84.
- Blanchard, Lucy M. *CHICO*. Boston: Houghton Mifflin. \$1.65.
- Brandeis, Madeline. *THE LITTLE MEXICAN DONKEY BOY*. New York: Grosset and Dunlap, 1931. \$.50. A story of a Mexican boy who becomes a potter. He has a funny little burro named Amigo. This is a story of modern Mexico. Intermediate.
- Castillo, Carlos. *MEXICO*. Chicago: Wheeler Publishing Co., 1939. \$1.60. A travel book about Mexico and its people. Photographs taken by Burton Holmes. Upper elementary.
- Flack, Marjorie. *PEDRO*. New York: Macmillan Co., 1940. \$2.00. The son of an Indian potter who attends a fiesta and after making friends with an American boy, rescues him from an enraged bull. Intermediate.
- Gaines, Ruth. *THE VILLAGE SHIELD*. New York: Dutton Publishing Co., 1917. \$2.00.
- Rhoads, Dorothy. *THE BRIGHT FEATHER AND OTHER MAYA TALES*. New York: Doubleday, Doran Co., 1932. Short stories about how corn was discovered, also other interesting tales. (3-5).
- Russell, Mary. *SI, SI, ROSITA*. Boston: American Book Co., 1936. \$.60. The authentic picture of the home and play life of a middle class Mexican family. Rosita is a lovable little girl, whose father usually says "Si, si," whenever she asks anything of him. (3-4).
- Sawyer, Ruth. *THE LEAST ONE*. New York: Viking Press, 1941. \$2.00. The Least One is a little burro whom Paco loved very much. He disappeared, and the story tells of the miracle that restored him to Paco.

### Reading Books.

- Heffernan, Harper, and Wulfig. \**SAILS SET FOR TREASURE LAND*. (Golden Road to Reading Series). Chicago: Benj. H. Sanborn, 1941. \$1.16.
- Hildreth, Gertrude. \**FARAWAY PORTS*. (Easy Growth in Reading Series) Third Book, Level One. Chicago: John C. Winston Co., 1940. \$.92.
- Smith and Bayne. \**DISTANT DOORWAYS*. (Unit Activity Reading Series). New York: Silver Burdett Co., 1940. \$1.12.
- Wahlert and Hahn. \**MEETING OUR NEIGHBORS*. (Child Development Readers, Third Reader.) Boston: Houghton Mifflin, 1939. \$.88.

### Social Studies Books.

- Kelty, Mary. \**LIFE IN EARLY AMERICA*. pp. 63-68. Boston: Ginn, 1941, and *OTHER LANDS AND OTHER TIMES*. (The first of three new histories for the middle grades). Boston: Ginn, 1942. pp. 390-393.
- McGuire, Edna. \**A BRAVE YOUNG LAND*. (McGuire Social Background Series). Boston: Macmillan Co., 1937. \$1.08. and \**AMERICA THEN AND NOW*. (from the above series.) Boston: Macmillan, 1940. \$1.32.
- Meyer, J. O. and Hamer, O. S. \**THE NEW WORLD AND ITS GROWTH*. Chicago: Follett Publishing Co., 1941. \$1.96.



- Saur, Carl. \*MAN IN NATURE. (America Before the Days of the White Man.) Boston; Scribner's, 1939.
- Smith, J. Russell. AMERICAN LANDS AND PEOPLES. Grades 5-7. Chicago: John C. Winston Co., 1939. \$1.56.
- Wilson, Wilson, and Erb. WAYS OF LIVING IN MANY LANDS. Boston: American Book Co., 1937. Grades 3-5. A Social Studies Reader, organized in a series of units, one of which is Mexico.

### Helpful References.

- COLUMBIA ENCYCLOPEDIA. P. J. Collier and Son, New York, 1936.
- LINCOLN LIBRARY OF ESSENTIAL INFORMATION. Buffalo: Frontier Press, 1941.
- NEW INTERNATIONAL 1942 YEARBOOK. Chicago: Funk and Wagnalls Co., 1941
- \*WORLD BOOK ENCYCLOPEDIA. Chicago: The Quarrie Corp., 1941. Vol. II. The material in this encyclopedia is excellent. Prepared units can be obtained for use in teaching.

### Free and Inexpensive Teaching Aids.

- AROUND A MEXICAN PATIO. Nashville, Tenn.: Cokesbury Press. Ethel L. Smither. Illustrations. \$.25.  
A World Friendship Unit for Primary Children. Information on Mexican games, songs, fiestas, Christmas, etc.
- AZTEC PEOPLE. Washington, D. C., 1201 16th St., N.W. The World Federation Associations, 1941.
- FIESTA. Racine, Wisconsin: Whitman Publishing Co., \$.10. By Jock and Sharon. A paint book illustrating the dress, food, games, occupations of Mexicans. Large map showing principal cities.
- MAP OF MEXICO. New York: Friendship Press, 150 5th Avenue. A picture map of the country which may be colored if desired. Accompanying the map is an insert sheet with descriptive text, prepared by Margaret Loring Thomas. Very good material.
- MEXICO. Chicago, Illinois: Illinois Central Railroad, 135 E. 11th St., J. V. Lanigan, Traffic Manager. A pamphlet of 24 page illustrations, with descriptive material and historical information. Photographs.
- MEXICO SPEAKS TO YOU. New York: 13 E. Eighth Street. Fiesta, Fred Leighton's Indian Trading Post. \$.03. This is a six-page illustrated folder on the native crafts of Mexico.
- THE OTHER AMERICAS THROUGH FILMS AND RECORDS. Washington, D. C.: American Council on Education, 1942. An excellent new reference for films and music recordings.

### Films on Mexico.

- LAND OF MEXICO. Describes geographical features of Mexico, including its people both in the cities and in the country. Glimpses of Vera Cruz and Mexico City. Pr 36.
- MEXICAN CHILDREN. Reveals the home, school, and play life of a Mexican boy and girl. A small town in holiday setting; an Aztec costume dance, and fiesta music. Pr 15.
- NATIVE ARTS OF OLD MEXICO. Shows pottery and tile-making; weaving figures of straw; basket-making, wood-turning. US 41.
- PEOPLE OF MEXICO. Presents a living account of the origin and development of the Mexican people, with emphasis on their dependence upon the land. Portrays a feast day in a small village. Pr 37.

The films listed above are available to schools through the Division of Teaching Aids, Boston University, School of Education.

**GRADE 6.****SAMPLE UNIT: LIVING IN THE MIDDLE ANDEAN COUNTRIES.****UNDERSTANDINGS: GEOGRAPHIC.**

1. The first white men who came to the Middle Andean Countries found civilized Indians who had learned the use of metals and how to spin and weave. Today, the descendants of these Indians make up the largest part of the population, but, being very unprogressive, they live about the same as their ancestors did four centuries ago.

2. The Andes Mountains have dominated the economy and life of the Middle Andean Countries by physically dividing them into distinct geographical areas with different ways of life.

3. The eastern lowlands of the Middle Andean Countries are mostly jungle areas difficult to clear for farming, difficult for transportation, and difficult for healthy living because of disease carrying insects. The few people who live there have little interest in other people or areas.

4. The western coastland is mostly desert chiefly because of the cold Peruvian Current; but irrigation has turned the numerous river valleys into oases. Since the products from these valleys and from the wet coastland areas are the chief exports, the people living there have trade and world interests.

5. The highlands of the Middle Andean Countries are the most populated areas. Located in the tropics, these areas are warm enough for temperate zone crops and subsistence farming even at high altitudes. Though farming, herding, and mining are carried on, most highland people pay little attention to other sections and to the rest of the world.

6. The improvement and extension of land, water, and air transportation will help in the unification and economic life of the Middle Andean Countries, as poor transportation has kept the people apart and prevented full development of the rich mineral resources.

**Understandings: Social.**

1. Dangers of a communistic state are apparent from the downfall of the Incas.

2. The Latin American peoples and those of the United States must work together to further the ideals of the Good Neighbor Policy.

3. Many characteristics of each of these two groups of American people are worthy of emulation by the other.

4. Results of man's labor in each of these groups of American people have made life more enjoyable, more comfortable, healthier, and safer for both.

**Study Skills.**

1. Locating information in encyclopedias, atlases, bibliographies, World Almanac, pictures, and other sources.

2. Using table of contents, title page, index, appendix, pictures, and graphs.

3. Finding key sentences, outlining, taking notes, summarizing, arranging materials, and learning new words.

4. Planning an area to be studied, and carrying out the plan.

5. Evaluating the information found and the materials used.

6. Using the acquired information and materials in carrying out the objectives.

**APPROACH.**

Our sixth grade reading book, "On the Long Road", has a unit, "Neighbors on the Road", which has for a background different places in South America. The story "The Long-ago People of Peru" captured the interest of the children. To further this interest we added large colored

pictures of the Andes Mountains and of the early Inca Civilization, (Life, Vol. 25, No. 5), pictures of llamas, and pictures of the life, customs and religious activities of the Incas. (National Geographic, Feb., 1938). These were displayed alongside the map of South America and the World Map. We talked about these pictures in relation to places on the map. "Jana of the Andes" (Grade Teacher, June, 1947, p. 54) was read to the children. For a few days we talked about the pictures, facts we knew, ideas from the story, and the meanings of words we were meeting for the first time, or could not clearly explain. "Paco Goes to the Fair" was then read to the class, partly because of its appeal to children, but also because it put the Indians in a new setting.

## PLANNING AND PURPOSING.

### **What We Wish to Know.**

1. Origin and civilization of the Incas. How did the Incas get control of the Middle Andean Countries? Why were the Incas so highly civilized? Where did they come from? How much land did they control?
2. Shelter. How were the houses built and furnished? What materials were used? In what ways were the houses heated and lighted? Where did travelers stay?
3. Clothing. Of what materials were clothes made? Where did they get the materials? How were clothes sewed or fastened together?
4. Food. What foods did they eat? Did the Incas have any special food for themselves? How was it prepared? What kind of kitchen utensils and dishes did they use? What happened when crops failed?
5. Occupations. Did they do all their own work or did they have slaves? Which kind of work was most important? Did everyone have to work?
6. Education and Recreation. What languages did they speak? Did they have schools? What did they learn in schools? What kind of games did they play?
7. Religion. Whom did they worship? What kind of churches did they have?
8. Transportation—Communication—Trade. What was the chief means of transportation? How were bridges made? What was the fastest means of travel? How were messages sent from place to place? Did they trade outside their empire? What things did they trade? What did they use for money? Did they have trading posts?
9. Government. Who was the head of the government? Who made the laws? Were the people taxed? Did the government help the people?
10. Conquest. When did the Spaniards come to the Middle Andean Countries? Why did the Spaniards try to conquer the Indians? If the Incas were so civilized, how did the Spaniards conquer them? When and where did the Spaniards set up their government?
11. Location of the Middle Andean Countries. Where are the Middle Andean Countries? Can you go there by automobile? How can you get there by sea and air?
12. Countries. Where did each country get its name? What are the capitals of the countries? Are there any important cities besides the capitals? How much of the countries is mountainous? Do all parts get enough rain? Why is there a desert? Are there any good sea-ports? What are the chief products (agricultural and manufactured) of the Middle Andean Countries today?
13. People. What kinds of people live in the Middle Andean Countries now? How many Indians still live there? How do people live on the desert and in the mountains? Did the Spaniards change the Indians' ways very much? Are there any special ways in which the white people live differently from us? Do the Indians and white people help each other? What do people do for a living? Do we trade with the people of the Middle Andean Countries? What do these people sell to us and buy from us? How do they travel over the mountains? What animals do they

use to carry burdens? Is air travel used much? What other means of transportation do they have? How do they send messages today? What is the religion of the white people and the Indians? Do the Indian and white children go to the same school?

14. Government. Are the Indians or the Spanish the rulers now? Do they send a representative to our country? Do we send one to theirs? Do all the countries have the same flag? What kind of government do they have?

#### SOURCES.

As children asked questions, possible sources of information were given. These were listed on the board.

Where we might find answers. Textbooks; maps; encyclopedias; atlases; World Almanac; graphs; people; pictures; motion pictures; magazines; radio; newspapers.

Where we might get the materials: Home; school; school, town, and state libraries; school personnel; travel agencies.

How we can get them: Each person getting what he can; special committees: library, library table, picture, display; letters asking for information.

#### PLANS FOR ACTIVITIES.

##### **Some things we should like to do.**

1. Read books about the Incas and the people who live in the Middle Andean Countries now, and collect pictures.
2. Write letters to travel bureaus, etc.
3. Make oral and written reports on what we read or see.
4. See motion pictures of Incas and present people; listen to recordings.
5. Sing their songs and dance a folk dance.
6. Collect any thing we can from these countries: products, souvenirs, stamps, etc.
7. Make a sand table scene showing how the Indians lived in the Inca days.
8. Make a mural showing present life and travel in the mountains.
9. Make maps: Inca Empire; rainfall; vegetation; relief; population; air, sea, land routes.
10. Give the room an atmosphere, by window pictures, borders, pictures and drawings.
11. Draw pictures of the people during Inca days and now showing their work, play, etc. Make costume dolls.
12. Make booklets for new words.
13. Make a chart of flowers in our gardens that came from the Middle Andean Countries originally.
14. Weave something Indians use.
15. Collect current events—keep bulletin board up-to-date.
16. Make an animal book with pictures, stories, habitat.

#### STANDARDS FOR GROUP WORK.

Since there are so many questions to be answered, the children decided to divide into committees. Each group selected its own chairman and decided where it could best carry on its work. For activities other than reading we had the use of another room.

It was further decided that they should have certain standards for the chairman, the committee and the work. The children made and listed them for reference and evaluation.

A good chairman does his share of the work; divides opportunities and responsibilities

fairly; secures needed materials and takes care of them; reports difficulties; reports on helpful members; respects other members' opinions.

A good committee member does his share of work; works quietly and does not disturb others; works until he finishes the problem; respects other members' opinions; handles materials carefully; finds something else to do if material is not available to him; takes his part agreeably; uses other person's materials only with permission from the owner.

Good work shows careful following of directions; correct margins; neat arrangement; neat writing; careful proof reading; careful planning; good use of materials.

#### OTHER POSSIBLE APPROACHES.

1. Pictures of animals native to the region, such as alpaca, tapir, llama, guanaco, vicuna. Stories of Llama's insistence on his rights are always of interest to the children. Stories like "Red Tassels for Huki" by Anna Barris, or "The Lucky Llama" by Alice C. Desmond, appeal to children who like animals.

2. During Spring, displays on the bulletin board of packets of seeds of salvia, cypress vine, petunias, spider plant (cleome) nasturtiums, morning glory, verbena, salpiglossis, yellow trumpet, butterfly flower, browallia, four o'clock, cup flower, etc. These flowers commonly grown in our gardens are natives of the Middle Andean Countries. Cannas and Peruvian lilies are, too. The sunflower was the national flower of the Incas, who were sun worshippers. The flower was carried in religious processions.

In the fall stories about the potato. Spaniards found Indians eating potatoes, and introduced them to Europe. We usually eat white or yellow potatoes but in the markets of the Middle Andean Countries you see pink, yellow, white, purple, orange, and black ones for sale.

3. Pictures of Inca Indians showing the progress of their civilization—(National Geographic, Feb., 1938, excellent) with pictures of a tribe of our own Indians. Pertinent questions listed about pictures to bring out the differences in the progress of civilization of the groups. "Tupak of the Incas" by P. A. Means, is an excellent story with authentic background. It is too difficult, however, for slow or average readers and would have to be read to some classes.

4. Displays of tagua nuts with buttons or miniatures made of this vegetable ivory; of cacao beans, cocoa, and chocolate; of toquilla palm and Panama hat; of balsa wood and model plane; of kapok and pillow.

5. Viewmaster (stereoscope) and viewmaster reels of the Middle Andean Countries.

6. Story of Pizarro. Children at this age level like historical approach and the story of Pizarro and his treatment of Atahualpa greatly appeals to them. They like, too, stories of his loyalty to the Emperor, his honesty, and his faithfulness to faithful servants.

7. Pictures of Equatorial Monument along with a certificate given by the Panagra Air Lines to those who cross equator in a plane, and a certificate given by a steamship line (or navy) to those crossing on sea.

8. Display of books open to attractive illustrations. Many such books are in most libraries, e.g., "Paco Goes to the Fair", "Gregorio and His Donkey".

9. An imaginary trip using materials furnished by travel bureaus; e.g., Pan American Airlines.

10. Motion pictures of Andean Countries or colored slides. (American Council on Education, Washington 6, D. C. catalog.)

11. Stamp collection—stamps have historical and geographical meaning.

12. Reading of legends about Manco Capac; of the islands in Lake Titicaca; of supposedly buried treasure.

**Our New Vocabulary.**

propaganda		plaza
Pan-American	granaries	quinine
mestizo	guano	zambo
barter	terraces	vegetable ivory
alpaca	puna	Panama hat
llama	sages	vanadium
guanaco	centurion	
vicuna	quipu	Bolivia
altiplano	litter	Guayaquil
aqueduct	puric	Iquitos
plantain	cacao	Lima
yucca	Atahualpa	Callao
immigrant	Huascar	Cerro de Pasco
fiber cable	Pizarro	La Montana
Aymara	Almagro	Sucre
Quecha	Sapa Inca	La Paz
Quito	Bolivar	Humboldt Current
Cuzco	San Martin	balsa
Inti	Lake Titicaca	coca
Inca	Ecuador	poncho
	Peru	selva

**WORKING PERIODS.**

The children wanted to start with the Incas and each committee chose a topic. Each group had its own list of questions.

At the beginning of each period we discussed the work of the day. During the first days, the teacher, before school, discussed with the chairmen the books that would be helpful to their groups. This saved time and encouraged the children since these first books were not too difficult. On the library table we kept only the material that pertained to the Incas. We kept the fiction together and the non-fiction together. These were so marked and explained to the children. We gradually added other books but were careful to do it slowly. Children often get the time sense all confused when reading stories of centuries past and present day ones at the same time.

When the children went to their work-places, the chairmen passed the books out. The children began to look up their topics. Use of the index, table of contents, etc., was not entirely new and little difficulty was experienced except with the World Almanac and one set of encyclopedias. The children took notes and the source of information. As questions were answered they checked them off on their list. When as many as possible were answered, they organized them into reports. When the first group was ready for organizing we suggested discussing what they were to do. They said they knew how and did it themselves. Each group did the same. Later, each chairman told how his group did it. They were more or less alike. The children said that it was easier to organize the answers than the questions because there were fewer answers for one group.

Working the first three days of the week on their reading, writing, etc., and the last two days on construction worked out very well. This was not a rigid program as some groups finished sooner than others and moved on to other things.

When a group had finished with a topic and had reported, it chose another. When there were no more left pertaining to the Incas, individuals took other topics while the groups finished their work. After the Incas, we went on to the present day people.

Some days we did not work on committees, but worked together on latitude, longitude,

and sun position lines; or read, outlined, picked out the topic sentence, etc. We had sets of geographies so this was easy. Sometimes one group read from one source and another from another. Then we would compare. It helped to clear up any doubtful ideas if we all studied together once in a while.

A large cardboard was hung up on which was pasted an envelope for each child and teacher. The teacher put in notes for the children about their work; children wrote notes about their problems, or notes of thanks, etc. This post office idea was very helpful.

Each chairman made a folder for the papers belonging to his committee. This was always kept in the same place.

The chairman received a copy of the questions for his members. Every day he came in early and got materials ready. As there was much duplicate material, no chairman had much difficulty. If, however, there was a demand for a particular book, they took turns. At the end of the period, the chairman reported on work done, any problems on which they needed help, and the people who were especially helpful. At first they were inclined to report on the ones who "did the most" or "the best". It became clear as they worked longer that some people got books which were more helpful and therefore it was easier for them to get information that particular period. These differences took time to discuss but the true meaning of "helpful" eventually materialized. Each day the children checked their work by the standards they had set up for themselves. With the aid of helpers, the chairmen checked and returned all material.

Early in the unit the chairmen and the committee members found out the necessity of putting down the source of information very carefully so that all information could be checked easily if a question arose.

New questions relating to their topics came up. If the committee agreed, they were included in the list of questions.

Though there were many questions about the Incas, the answers were not difficult to find. The answers were organized into reports which were copied by the secretary. These reports were given to other committees who asked questions, offered suggestions, and told of the things they had read.

When all reports on the Incas were finished, the children wanted them displayed. A long piece of shelf paper was attached to the blackboard with scotch tape. The word INCAS and cut outs of an Inca man, woman, and child were pasted on. The reports were mounted on papers of the same colors as the letters and put on the white shelf paper with ace corners. They were left up for a week or so, until all had had time to read and compare them.

After the committees had worked a few days on the questions, someone suggested that they make a map of the Inca Empire. They all wanted to make one. It was brought out in discussion that they could use an outline map or make one of their own; they decided on the latter. Some were very good, some fair, some poor. The children who had difficulty were helped by those who found it easier, until everyone had a presentable one. The children chose and displayed the better ones.

Soon they were alternating the periods—the children read, drew, or made things. They discussed what they had read, how they were progressing, what they would do next, and how they evaluated their work.

Committees and individuals followed their own interests. Two boys who came across a small map of Cuzco in the days of the Incas enlarged it on a large cardboard. It showed where the palaces, gymnasium, teaching house and temples were. A girl came across a story of flowers native to the Middle Andean Countries, now commonly grown in our gardens. Though two boys helped her find and cut pictures she mounted them and made a chart which she used when reporting. She showed packets of seeds which the children decided to plant in their gardens when it was time.

The children drew many pictures of Inca life, and made window cut-outs of a sunflower, the national flower of the Incas. Later they put up some of the cacao trees and pods. When deciding on a border for the room, the children made four designs for the four sections of blackboard. These showed Indian designs and scenes. Colors were carefully chosen after study. Later they changed the borders to show modern life.

The children made an Inca village on the sand table. The boys made the mountains of sized burlap stuffed with crumpled newspapers, covered with patching plaster and colored with poster paints. The girls made the Indians and dressed them in Indian fashion. The boys made most of the llamas, sewing the yarn with as much ease as the girls. Together they made the houses and terraces, and planted the "crops".

NOTE: After the sand table was finished, I saw in the 1949 Popular Mechanics Garden Book an excellent way to thatch a roof. With clay for the house and twigs for holding the thatch much better houses could be made.

Every morning a story or part of a story was read to the class. We started with "Tupak of the Incas". This book is excellent but difficult for most sixth grade children to read by themselves. They enjoyed the story and soon discovered that it answered some questions or settled some doubtful point. Then we read some of the legends and folk lore of South America. The children would take these books and read the stories again or others in the books.

As we went along new words were met. We listed them on the board, referred to them constantly and encouraged their use in oral and written work. Everyone made a vocabulary folder.

The children wrote to travel bureaus, the American Museum of Natural History, etc., for material. We were careful to heed requests of the Pan American Union and others that do not want children to write. Our experience was that material came too slowly for use at the time it was wanted. Many former sources of South American material informed us they have not resumed their before-the-war advertising but would in the near future.

The music supervisor introduced old Indian songs to the children. They learned these and others. Later they learned songs which showed the influence of the Spanish. The dance of the Indians "The HUANO" was presented as typical and one we find them dancing today at festivals.

As they began to read about the present-day people, they found that the Indians have changed their ways of living very little since Inca times; so they gave their time to the study of the countries and the white peoples.

Different committees began to make maps such as vegetation and rainfall maps. Since no one had ever made a relief map everyone wanted to make one. The children brought in cardboard, but every map warped. To the other extreme they went and brought in the ends of apple boxes. These were successful. They used patching plaster, water, and poster paints. These relief maps were unusually good; the children were very proud of them. The other maps were successful, too. By this time, of course, the unit had been in progress for weeks and standards were going up all the time; so it wasn't too hard to get pretty good results. The art supervisor in his check-up said all were unusually well done from the art angle.

A group of children made a mural. With a background of the Andes and a foreground of plateaus with road winding in and out the little red train chugged around a mountainside as a bus labored up a dirt road. Planes soared overhead as Indians trudged along the road with their faithful llamas. Out on the lake balsa boats took their passengers to their destination.

Using oak tag, a small group made an oasis plantation. As a river wended its way from the mountain, a field of cotton rose on one side and sugar cane on the other.

Other children made what interested them. Everyone wove a simple mat. A small group made a cacao "forest" with trees and pods. This, with some cacao beans and chocolate illustrated a special report on cacao. To illustrate the story of vegetable ivory whole tagua nuts (sent



by the Consul of Ecuador) were displayed. They are hard to cut so only one was split in two. They showed buttons, too, made from the nuts.

Different children made reports on such subjects as Simon Bolivar, Guano Birds, Holidays in Middle Andean Countries, Pizarro, San Martin, and the Quito Railroad.

Stamp collectors brought in their stamps and told stories of the designs.

There was no so called "culminating activity". School ended — not the unit.

#### EVALUATION: TESTS.

##### Quiz Program.

At the end of the study of the Incas the children made up questions for a quiz program. Each committee wrote its questions and answers on different colored paper. When choosing a question, a child took a slip not of his own group. After the quiz program they kept the slips and played with them as a game.

A few of the questions, as the children wrote them.

1. Tell at least four subjects taught in the Inca schools that we have in our schools.
2. Did the Indians receive any education? What kind?
3. Who was Inti?
4. Tell about three games that the Indians played that we play.
5. What language was spoken by the Indians and Incas?
6. What was a quipu?
7. How was the Inca carried from place to place?
8. What was the fastest means of communication? Of travel?
9. Bridges were mostly made of what?
10. Tell one food law.
11. What method of cooking was used by the Indians?
12. How did they light a fire?
13. How did the Inca and Indian homes differ?
14. How were the Indians paid for their labor?
15. What was the chief cause of the Indians' failure to defeat the Spaniards?
16. What kind of a government did the Indians have?
17. Who taught them how to make such beautiful things for their churches?
18. Tell about some classes of people that did not have to work.

##### Matching Test. (Sample Questions)

In Column I are the beginnings of sentences. In Column II are the endings of these sentences, but they are not in the correct order. Write the letter that stands for the correct ending in the blank after each beginning of a sentence

#### Column I

1. The steady southeast trade winds make the eastern part of the Middle Andean Countries wet because \_\_\_\_\_
2. Vanadium is important because \_\_\_\_\_
3. In the desert oases Peru raises \_\_\_\_\_
4. Most of the people live in the highland areas because \_\_\_\_\_
5. Many of the descendants of the Inca live \_\_\_\_\_

#### Column II

- A. its two most valuable crops, sugar cane and cotton.
- B. in the highlands where they herd their animals, or farm.
- C. the warm winds give up their moisture as they rise.
- D. in the jungles on the eastern slopes of the Andes.
- E. it is cooler and farming can be carried on at high altitudes.
- F. it is used in making steel stronger.

**Vocabulary Game.**

Fill the blanks with the correct words from the following list.

balsa  
mestizo  
barter

poncho  
litter  
alpaca

vegetable ivory  
guano  
llama

1. The product of the tagua palm tree used in making buttons is \_\_\_\_\_.
2. A person of mixed Indian and Spanish blood is called a \_\_\_\_\_.
3. The loose garment worn by the Indians living in the highlands is a \_\_\_\_\_.
4. Bird droppings used for fertilizer by the Indian farmers is \_\_\_\_\_.
5. The animal which furnishes the best wool for the Indians' use is the \_\_\_\_\_.
6. \_\_\_\_\_ is to trade one thing for another without the use of money.
7. A covered and curtained couch provided with handles used in carrying passengers is a \_\_\_\_\_.
8. Knotted ropes on which records were kept are \_\_\_\_\_.

**Multiple Choice Quiz.** (Samples, made up by the children.)

Write the number of the correct answer at the end of each sentence.

1. The capital city of Ecuador is (1) Quito, (2) Guayaquil, (3) Cuenca, (4) Ambato, (5) Riobamba.
2. The coast of Peru is made cool by the (1) Equatorial Current, (2) Japanese Current, (3) Gulf Stream, (4) Peruvian Current, (5) Labrador Current.
3. Most Indians in the Middle Andean Countries live in (1) desert oases, (2) river valleys, (3) wet coastlands, (4) eastern jungles, (5) highlands.
4. The source of our chocolate is (1) cocoa, (2) toquilla palm, (3) tagua nuts, (4) cacao, (5) cinchona.
5. The highest lake in the world used for travel is on the boundary between Peru and (1) Chile, (2) Bolivia, (3) Ecuador, (4) Columbia, (5) Brazil.
6. The official capital city of Bolivia is (1) LaPaz, (2) Potosi (3) Sucre, (4) Oruro, (5) Santa Cruz.
7. In the mountains of Peru are the world's largest deposits of (1) gold, (2) copper, (3) uranium, (4) vanadium, (5) iron.

**EVALUATION: COMMENTS.**

In connection with a Special Studies unit, it is especially interesting to notice in the children the gains in personality and in social growth that result from the procedures used.

Near the close of school the children were asked how they liked the unit, what they liked most, and what they liked least. The children were unanimous in their approval, several saying they hoped they would never have to study geography in any other way because it was much more interesting, and one learned more. Many said they liked everything, while others signified some particular phase.

Two children said they did not like working in committees. One was a little girl. In this same class was her brother, an older and slower pupil. She was never content unless she was with him, but the teacher intentionally separated them. Had he been with her in a committee, he never would have done so well — and neither would she. Toward the end I thought she was improving, because apparently she seemed happy enough in her group and she did well, too. However, she must still have felt the committee work kept them apart.

The other child who did not like committee work was one of the nicest boys in the room.

I was very much surprised when I recognized his writing for no one had worked harder or more faithfully than he. I talked with him and he tried hard to tell me the reason. It seemed his group was always the last to get things done. He was the chairman and he felt responsible. I talked about that and other angles and he seemed to get a different idea. As he is over-conscientious I am not sure whether another experience would leave him feeling better about it or not. He knew his committee had done excellent work; so it was not a lack of appreciation on our part.

Two boys, one rather precocious (R.) and the other extremely shy (W.) were also especially interesting. R. had never been accepted by the other boys although he had been all the way through school with them. I have never seen a child so rejected by his classmates. His father was dead, and his mother and grandmother devoted their lives to him. His vocabulary was unusually mature, but the others scoffed and considered him a show-off. He could not run correctly, throw a ball, or do anything a boy should be able to do; he just didn't know how because he never did those things. In the classroom no one would ever choose him.

The shy boy, (W.) was the other extreme. We had tried everything, but he still squirmed, hung his head, blushed, and uttered not a word when spoken to.

These two boys were put in the same committee. When the group voted, R. was chosen chairman. I was surprised. He took the position very seriously and his committee got off to an excellent start. It wasn't long before I felt that all was not well. Apparently the committee was working yet I had the feeling it was accomplishing mighty little. One day R. came up to me and in his very grown-up way said, "My committee has just taken a secret ballot and I am unanimously fired as chairman". I said, "No one is dismissed without a reason. Why don't you find out?"

I followed him over to the chart on which the standards were printed. He pointed to the standards for a good chairman. "There", he said, "is the cause of my being unanimously fired by secret ballot."

After going through the items one by one and discussing them from his point of view and mine, he began to see that being a good chairman didn't mean going to the library, getting the "best works on the subject" and having Mother stay up half the nights with him so he could get the answers to all questions. Neither did it mean because his answers were from adult books the other members' answers were not "good enough for the report his committee was going to write". A good chairman does not work this way. I suggested he tell the members what the trouble was. He told them. They listened politely but on the next vote they chose W. as chairman. R. said he was satisfied, and knew "he had the wrong slant on things".

W. did an excellent piece of work. He seemed to come out of his shell, was no longer shy, played with R. on the playground, talked to us, offered suggestions, and was a different person entirely. If the unit did no other thing, it worked a miracle in W. And the red letter day in R.'s life came before the end of school. When he came on the playground W. and the other boys were playing baseball. They ran down to greet him and asked him to play. "They asked me! I never asked them! This is the happiest day of my life!"

As far as we were able to tell from the simple tests, reports, discussions, etc., the children carried out the objectives. The understandings we had hoped they would get seemed to be clear to all. We talked so much about the Incas and their way of life and why the empire fell apart particularly when the people had to think for themselves it would seem all should be glad we do not live under such a government. The children discovered many things about the peoples, especially the children. They found out how much more serious the children in the Middle Andean Countries are about their school work than we are; how courteous they are, etc. On the other hand they found them lacking in the give and take in sports that we have, and in some other things.

In the study of products and trade, they could see (we hope) the dependence of our country on them for certain materials and their dependence on us for other things. They learned of the valuable help given by American engineers in the building of their railroads; the help of the Rockefeller Foundation in cleaning up Guayaquil, and of many other examples of the neighborliness.

## GRADE 6.

### AUDIO-VISUAL AIDS.

The following films and transcriptions listed as aids in the Social Studies curriculum are available from the Office of Radio Audio-Visual Aids in the State Department of Education Building at 200 Newbury Street, Boston 16, Massachusetts. All transcriptions are on 16 inch discs, requiring a dual speed playback machine (78 r.p.m. and 33-1/3 r.p.m.) for playing. Record albums are on regular 78 r.p.m. discs. All films are 16 mm. width and sound.

#### FILMS.

- F 1 Adventures of Chico, 60 min., black and white.
- A 3 Arts and Crafts of Mexico, 10 min., black and white.
- G 1 Land of Mexico, 10 min., black and white.
- G-5 Argentina (People of Buenos Aires) 10 min., black and white.
- G 6 Brazil (People of the Plantations), 10 min., black and white.
- G 7 Holiday Island (Georgian Bay, Canada), 10 min., color.
- G 8 Highland Holiday (Cape Breton Nat'l Park), 20 min., color.
- G 9 Rocky Mountain Trout (Jasper Nat'l Park), 20 min., color.
- G 10 Seaside Holiday (Prince Edward Island), 10 min., color.
- G 11 Ski Holiday (Canadian Rockies), 10 min., color.
- G 12 Family Outing (Banff Nat'l Park), 10 min., color.
- G 15 Peoples of Canada, 22 min., black and white.
- G 26 Alaska: Story of a Frontier, 20 min., black and white.
- S 38 Americans All, 23 min., black and white.

#### TRANSCRIPTIONS.

THE FOSTER FAMILY SERIES (New England and South American countries).  
Thirteen 15 minute programs.

In addition to the films and transcriptions listed above, teachers will find great help in choosing audio-visual aids for use in the three areas of Social Studies in the sources listed below.

1. EDUCATIONAL FILM GUIDE, H. W. Wilson Co., New York. An annual listing of films with monthly supplements. This guide lists films alphabetically by title and subject and includes, in many cases, a review of the film by scholastic magazines. Local distributors for the films are also given.
2. FILMSTRIP GUIDE, H. W. Wilson Co., New York. An annual listing of filmstrips with monthly supplements of the same type as described above.
3. EDUCATORS' GUIDE TO FREE FILMS, Educators Progress Service, Randolph, Wisconsin. An annual listing of all sponsored films which are available for rental for the cost of postage only. Although they contain some advertising of the Sponsor's product, they are, nonetheless, excellent films.
4. LIST OF EDUCATIONAL RECORDINGS FOR MORE EFFECTIVE LEARNING, Educational Services, 1702 K Street, N. W., Washington 6, D. C. An annual listing of recordings which may be purchased by educators. Prices are given.

5. UNITED STATES OFFICE OF EDUCATION, Radio Section, Washington 25, D. C. Information on Transcriptions available (where to find) and general help in any question concerning radio programs, scripts, recordings, and transcriptions.

The Pan American Society of New England is prepared to provide audio-visual aids for the teaching of courses on Latin America. At the Society's headquarters, 75 Newbury Street, Boston, Massachusetts, pamphlets, maps, posters, books, periodicals, and lists of other reference material on Central and South America are available, as well as lists of films and speakers on Latin America, plus scripts of Spanish recordings of special interest to Spanish teachers and heads of Pan American clubs.

## GRADE 6.

### BIBLIOGRAPHY.

#### TEACHER.

- Armitage, Dykema, et al. OUR LAND OF SONG. Boston: Birchard, 1942.
- Beals, Carleton. FIRE OVER THE ANDES. Philadelphia: Lippincott, 1934.
- Beattie, et al. AMERICAN SINGER. Boston: American Book, 1941.
- Bemelmans, Ludwig. THE DONKEY INSIDE. New York: Viking, 1941.
- Botsford, F. H. COLLECTION OF FOLK SONGS. Vol. I. New York: Schirmer, 1930.
- Clark, Sydney A. THE WEST COAST OF SOUTH AMERICA. New York: Prentice, 1941.
- Clinton, D. J. MAN OF GLORY, SIMON BOLIVAR. New York: Morrow, 1939.
- Gregg, Harold. ART FOR YOUNG AMERICA. Scranton, Pa.: International Book Co., 1947.
- Gunther, John. INSIDE LATIN AMERICA. New York: Harpers, 1941.
- Herring, Hubert. GOOD NEIGHBORS. New Haven, Conn.: Yale, 1941.
- Labastille, Irma. CANCIONES TIPICAS. New York: Silver Burdett, 1941.
- Lasso, R. V. WONDERLAND ECUADOR. Ecuadorian Chamber of Commerce. New York.
- Means, C. W. OLD CIVILIZATION OF INCA LAND. New York: American Museum of Natural History.
- Means, Philip A. ANCIENT CIVILIZATION OF THE ANDES. New York: Scribner's, 1931.
- Newkirk, Louis V. INTEGRATED HANDWORK FOR ELEMENTARY SCHOOL. Boston: Silver Burdett, 1940.
- Niles, Blair. A JOURNEY IN TIME: A PERUVIAN PAGEANT. Indianapolis: Bobbs, 1937.
- Niles, Blair. DAY OF IMMENSE SUN. Indianapolis: Bobbs, 1936.
- Overbeck, A. O. LIVING HIGH, A HOME IN THE FAR ANDES. New York: Appleton, 1935.
- Peck, Anne M. ROUNDABOUT SOUTH AMERICA. New York: Harpers, 1942.
- von Hagen, W. ECUADOR, THE UNKNOWN. New York: Oxford, 1940.

#### Magazines and Pamphlets, etc.

- BOLIVIA. Consulate of Bolivia, 10 Rockefeller Plaza, New York 20.
- BUILDING AMERICA — OUR LATIN NEIGHBORS. (Vol. 5, no. 1) Americana Corporation, 2 W. 45th Street, New York.

ECONOMIC RELATIONS BETWEEN THE AMERICAS. Carnegie Endowment for World Peace, 405 W. 117th Street, New York.

National Geographic Magazine, National Geographic Society, Washington, D. C. (Back numbers especially helpful.)

An Adventure in Peru. R. Shippee. Jan., 1933.

A Forgotten Valley of Peru. R. Shippee. Jan., 1934.

Bolivia, Land of the Fiesta. A. Overbeck. Nov., 1934.

Bolivia, Tin Roof of the Andes. H. A. Phillips. March, 1943.

Bonds Between the Americas. T. Simpech. Dec., 1937.

Finding the Tomb of a Warrior God. W. Strong, C. Evens, Jr. Apr., 1947.

Heart of Aymara Land. S. McMullein. Feb., 1927.

Inca: Empire Builder of the Andes. P. A. Means. Feb., 1938.

Lure of Lima. W. Showalter. June, 1930.

Most Valuable Birds in the World. R. C. Murphy. Sept., 1924.

Mrs. Robinson Crusoe in Ecuador. Mrs. R. Gill. Feb., 1934.

Peru on Parade — Pith of Peru. H. A. Phillips. Aug., 1942.

Peru — Wealth Producing Birds. R. E. Coker. June, 1920.

Quinine Hunters in Ecuador. F. Rainey. March, 1946.

Staircase Farms of the Ancients. O. F. Cook. May, 1916.

Tin, The Cinderella Metal. A. Overbeck. Nov., 1914.

OUR AMERICAN NEIGHBORS. Coca Cola Company.

Pan American Airways, Educational Dept. 28 Bridge Plaza North, Long Island City 1, New York. (Booklets, maps, etc.)

Pan American Union, Division of Office Services, Washington, D. C. (Wealth of material — too many to mention separately by name.)

PERUVIAN ART. C. W. Mead, Book Shop, American Museum of Natural History, New York.

#### BOOKS FOR CHILDREN.

Adams, R. C. SKYHIGH IN BOLIVIA. Boston: Heath, 1942.

Allen, N. B. SOUTH AMERICA. Boston: Ginn, 1934.

Bannon, Luran. GREGORIO AND THE WHITE LLAMA. New York: Junior Literary Guild, 1944.

Barris, Anna A. RED TASSEL FOR HUKI. Chicago: Whitman, 1939.

Bemelmans, Ludwig. QUITO EXPRESS. New York: Viking, 1938.

Carpenter. OUR SOUTH AMERICAN NEIGHBORS. New York: American Book, 1942.

Comfort, Mildred H. PETER AND NANCY IN SOUTH AMERICA. Chicago: Beckley-Cardy Company, 1935.

Cordier and Robert. HISTORY OF YOUNG AMERICA. New York: Rand McNally, 1938.

Cusack, Alice. DOWN SOUTH AMERICA WAY. Chicago: Wheeler Pub. Co., 1942.

Dalgleish, Alice. THEY LIVE IN SOUTH AMERICA. New York: Scribner's, 1942.

Dalgleish, Alice. WINGS AROUND SOUTH AMERICA. New York: Scribner's, 1941.

Desmond, A. BOYS OF THE ANDES. Boston: Heath, 1941.

Finger, Charles J. TALES FROM SILVER LANDS. New York: Doubleday, 1939.

Gill, R. C. and Hoke, Helen. PACO GOES TO THE FAIR. New York: Junior Literary Guild, 1940.

- Gill, R. C. and Hoke, Helen. THE STORY OF THE OTHER AMERICA. New York: Houghton Mifflin, 1941.
- Goetz, Delila. NEIGHBORS TO THE SOUTH. New York: Harcourt.
- Greenbie, Sydney. CHILDREN OF THE SUN. New York: Row, Peterson, 1943.
- von Hagen, V. W. RICHES OF SOUTH AMERICA. Boston: Heath, 1941.
- Kummer, Frederic A. COURAGE OVER THE ANDES. New York: Junior Literary Guild, 1940.
- Levy, Harry. THE BURRO THAT LEARNED TO DANCE. New York: Knopf, 1942.
- van Loon, Hendrik. LIFE AND TIMES OF SIMON BOLIVAR. New York: Dodd, Mead and Company, 1943.
- Lovelace, Maud, and Delos. THE GOLDEN WEDGE. New York: Thos. Y. Crowell Co., 1942.
- Malkus, Alida. ALONG THE INCA HIGHWAY. Boston: Heath, 1941.
- Means, Philip A. TUPAK OF THE INCAS. New York: Scribner's, 1942.
- Quinn, Vernon. PICTURE MAP GEOGRAPHY OF SOUTH AMERICA. New York: F. A. Stokes and Company, 1941.
- Upton, George P. FRANCISCO PIZARRO. Chicago: A. C. McClurg and Co., 1911.

#### **Booklets, magazines, etc.**

- Council for Inter-American Co-operation, Inc., 111 Broadway, New York 6. Booklets on all countries, map, etc.
- HELLO, SOUTH AMERICA. National Dairy Council, 1943.
- LLAMAS AND LLAMALAND, and THE TRUE STORY OF THE VICUNA. New York: S. Stroock & Co., 405 5th Avenue. (Free)
- Pan American World Airways, Educational Dept. 28, 19 Bridge Plaza North, Long Island City 1, New York. (Free material)
- Pan American Union, Division of Office Services, Washington, D. C. For Young Readers:
- |                           |                                    |
|---------------------------|------------------------------------|
| Jose de San Martin        | Simon Bolivar                      |
| The Guano Islands of Peru | Pan American Highway               |
| Francisco Pizarro         | Colonial Cities of Spanish America |
| The Incas                 | Transportation in Americas         |
- YOUNG AMERICA. Columbus, Ohio: American Education Press.

#### **Other Aids.**

- Viewmaster, Sawyers, Portland, Oregon. The following reels by number: Quito, Ecuador (611); Rural Life in Ecuador (612); Scenes of Ecuador (613); Lima I (621); Lima II (628); Arequipa to Cuzco, Peru (622); Ruins of Pachacamac, Lima (623); Ruins of Fortress Cuzco (624); La Paz, Bolivia (651).

#### **Maps.**

- Poster Maps to Build Up, South America. Boston: E. E. Babb & Co.
- Picture Maps of South American Countries. Springfield: Milton Bradley Company.

#### **Recordings.**

- Peruvian Indian Melodies. (Songs in Quecha and Spanish) Columbia, p. 4219 M; p. 4220 M.

- Motion Pictures, Slides, etc.** Pan American Society of Massachusetts, 75 Newbury Street, Boston 16, Massachusetts.

## SUPPLEMENTARY BIBLIOGRAPHY FOR GRADES 5 and 6.

**Fiction**

- Alcott, Louisa May. *LITTLE WOMEN*. New York: Little.
- Allen, Merritt Parmelee. *BATTLE LANTERNS*. New York: Longmans, 1949.
- Bowers, Gwendolyn. *ADVENTURES OF PHILIPPE; a story of old Kebec*. Aladdin, 1949.
- Brink, Carol Ryrie. *CADDIE WOODLAWN*. New York: Macmillan, 1935.
- Burbank, Addison. *CEDAR DEER*. New York: Coward, 1940.
- Burgwyn, Mebane Holoman. *LUCKY MISCHIEF*. New York: Oxford, 1949.
- Canfield, Dorothy. *SOMETHING OLD, SOMETHING NEW*. New York: Scott, 1949.
- Chase, Richard, coll. *GRANDFATHER'S TALES*. New York: Houghton, 1948.
- Coatsworth, Elizabeth J. *BOY WITH THE PARROT; a story of Guatemala*. New York: Macmillan, 1930.
- Dalgleish, Alice. *LITTLE ANGEL*. New York: Scribner, 1943.
- Daringer, Helen Fern. *MARY MONTGOMERY, REBEL*. New York: Harcourt, 1948.
- DuSoe, Robert C. *SEA BOOTS*. New York: Longmans, 1949.
- Edmonds, Walter Dumaux. *TWO LOGS CROSSING*. New York: Dodd, 1943.
- Fisher, Cyrus T. *AB CARMODY'S TREASURE*. New York: Holt, 1948.
- Forbes, Esther. *JOHNNY TREMAIN*. New York: Houghton, 1943.
- Havighurst, Walter and Marion. *SONG OF THE PINES*. Chicago: Winston, 1949.
- Kiser, Martha Gwinn. *GAY MELODY*. New York: Longmans, 1949.
- Knight, Clayton. *QUEST OF THE GOLDEN CONDOR*. New York: Knopf, 1946.
- Lampman, Evelyn Sibley. *TREASURE MOUNTAIN*. New York: Doubleday, 1949.
- Lathrop, West. *BLACK RIVER CAPTIVE*. New York: Random, 1946.
- Lathrop, West. *KEEP THE WAGONS MOVING*. New York: Random, 1949.
- MacKaye, David Loring. *JOHN OF AMERICA*. New York: Longmans, 1947.
- McSwigan, Marie. *OUR TOWN HAS A CIRCUS*. New York: Dutton, 1949.
- Meador, Stephen. *RIVER OF THE WOLVES*. New York: Harcourt, Brace, 1948.
- Meigs, Elizabeth Bleeker. *THE SILVER QUEST*. Bobbs-Merrill, 1949.
- Robinson, Tom. *TRIGGER JOHN'S SON*. New York: Viking, 1949.
- Robinson, Gertrude. *SIGN OF THE GOLDEN FISH; a story of the Cornish fisherman in Maine*. Chicago: Winston, 1949.
- Sawyer, Ruth. *ROLLER SKATES*. New York: Viking, 1936.
- Seredy, Kate. *CHESTRY OAK*. New York: Viking, 1948.
- Singmaster, Elsie. *THE ISLE OF QUE*. New York: Longmans, 1948.
- Snedeker, Caroline Dale. *DOWNRIGHT DENCEY*. New York: Doubleday, 1927.
- Steen, Elizabeth Kilgore. *RED JUNGLE BOY*. New York: Harcourt, Brace, 1937.
- Tee-Van, Helen Damrosch. *RED HOWLING MONKEY*. New York: Macmillan, 1926.
- Von Hagen, Victor, and Hawkins, Quail. *QUETZAL QUEST*. New York: Harcourt, Brace, 1939.
- Wyatt, Geraldine. *WRONGHAND*. New York: Longmans, 1949.

**Non-Fiction.**

- Barksdale, Lena. *THAT COUNTRY CALLED VIRGINIA*. New York: Knopf, 1945.
- Bonner, Mary Graham. *CANADA AND HER STORY*. New York: Knopf, 1942.



- Brown, Marion Marsh. *YOUNG NATHAN*. Westminster, 1949.
- Brown, Rose. *LAND AND PEOPLE OF BRAZIL*. Philadelphia: Lippincott, 1946.
- Cooper, Alice C., and Palmer, Charles A. *TWENTY MODERN AMERICANS*. New York: Harcourt, Brace, 1942.
- Dalgleish, Alice. *THEY LIVE IN SOUTH AMERICA*. New York: Scribner, 1942.
- Dalgleish, Alice. *WINGS AROUND SOUTH AMERICA*. New York: Scribner, 1941.
- Elting, Mary, and Gossing, Margaret. *WE ARE THE GOVERNMENT*. New York: Doubleday, 1945.
- Forbes, Esther. *AMERICA'S PAUL REVERE*. New York: Houghton, 1946.
- Foster, Genevieve. *ABRAHAM LINCOLN'S WORLD*. New York: Scribner, 1944.
- Foster, Genevieve. *GEORGE WASHINGTON'S WORLD*. New York: Scribner, 1941.
- Frost, Frances Mary. *LEGENDS OF THE UNITED NATIONS*. New York: Whittlesey House, 1943.
- Galt, Thomas Franklin. *HOW THE UNITED NATIONS WORKS*. New York: Crowell, 1947.
- Gill, Richard Cochran. *STORY OF THE OTHER AMERICA*. New York: Houghton, 1941.
- Goetz, Delia. *HALF A HEMISPHERE; the story of Latin America*. New York: Harcourt, Brace, 1943.
- Goetz, Delia. *NEIGHBORS TO THE SOUTH*. New York: Harcourt, Brace, 1941.
- Goetz, Delia. *OTHER YOUNG AMERICANS: LATIN AMERICA'S YOUNG PEOPLE*. New York: Morrow, 1948.
- Graham, Shirley. *THE STORY OF PHILLIS WHEATLEY*. New York: Messner, 1949.
- Hager, Alice Rogers. *BRAZIL, GIANT TO THE SOUTH*. New York: Macmillan, 1945.
- Hartman, Gertrude. *MACHINES AND THE MEN WHO MADE THE WORLD OF INDUSTRY*. New York: Macmillan, 1939.
- Hartman, Gertrude. *MAKING OF A DEMOCRACY; rev. and enl. ed.* Day, 1941.
- Henius, Frank. *STORIES FROM THE AMERICAS*. New York: Scribner, 1944.
- Hewes, Agnes Danforth. *SPICE HO! rev. ed. A story of discovery*. New York: Knopf, 1947.
- Hillyer, Virgil Mores. *CHILD'S HISTORY OF THE WORLD*. New York: Appleton-Century, 1924.
- Holberg, Ruth Langland. *GILBERT STUART*. New York: Crowell, 1948.
- Holbrook, Stewart. *AMERICA'S ETHAN ALLEN*. New York: Houghton, 1949.
- Langdon, William Chauncy. *EVERYDAY THINGS IN AMERICAN LIFE*. New York: Scribner, 1937.
- Lansing, Marion. *AMERICA IN THE WORLD*. Boston: Heath, 1949.
- Lucas, Mary Seymour. *VAST HORIZONS*. New York: Viking, 1943.
- Newcomb, Covelle. *BLACK FIRE; a story of Henri Christophe*. New York: Longmans, 1940.
- Quinn, Vernon. *PICTURE MAP GEOGRAPHY OF SOUTH AMERICA*. Philadelphia: Lippincott, 1941.
- Rothery, Agnes Edwards. *CENTRAL AMERICAN ROUNDABOUT*. New York: Dodd, 1944.
- Rothery, Agnes Edwards. *SOUTH AMERICAN ROUNDABOUT*. New York: Dodd, 1940.
- Shippen, Katherine Binney. *GREAT HERITAGE*. New York: Viking, 1947.

Shippen, Katherine Binney. *NEW FOUND WORLD*. New York: Viking, 1945.

Vance, Marguerite. *THE LEES OF ARLINGTON*, the story of Mary and Robert E. Lee  
New York: Dutton, 1949.

Vance, Marguerite. *PATSY JEFFERSON OF MONTICELLO*. New York: Dutton, 1948.

Welch, Earl. *CRADLE OF OUR NATION*. New York: Holt, 1949.

These books may be borrowed from local school and public libraries or, when not available at these sources, from the Massachusetts Division of Public Libraries, Department of Education, 200 Newbury Street, Boston, Massachusetts.

#### REFERENCES FOR TEACHERS.

Children's Catalog; seventh edition revised, 1946 and supplements. Reference.

State Certificate Reading List, 1948 and supplements. Free copies available at State Division of Public Libraries.

A Tree of Books, a book list for boys and girls. Gloucester, Massachusetts, 1948. 75 cents.

Junior Booklist of the Secondary Education Board, Milton, Massachusetts. Single copies, 20 cents.

Reader's Guide to Periodical Literature. Reference.

The Education Index. Reference.



**Boston Public Library**  
**Central Library, Copley Square**

**Division of**  
**Reference and Research Services**

The Date Due Card in the pocket indicates the date on or before which this book should be returned to the Library.

Please do not remove cards from this pocket.

BOSTON PUBLIC LIBRARY



3 9999 06708 760 9

